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The IRON AGE

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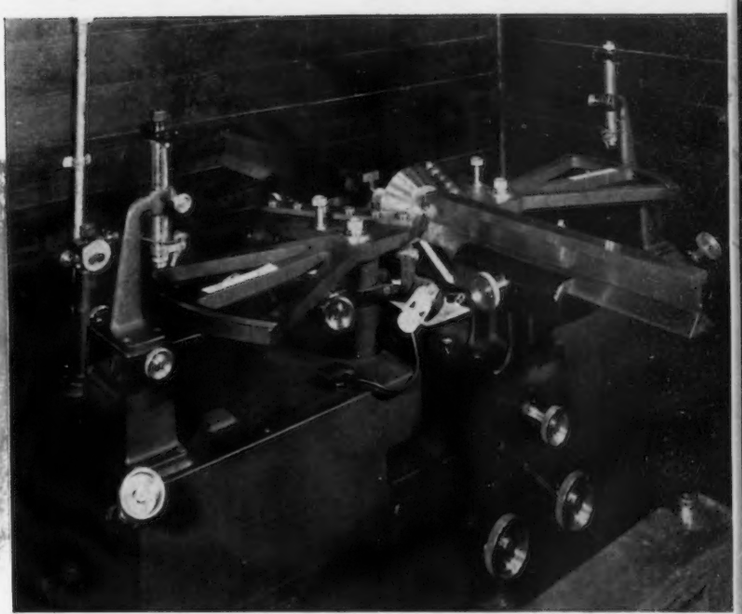

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is used many times every day to check taper gauges which turn check work gauges for the tapered parts of TIMKEN pered Roller Bearings. Although the degree of error of this achine seems unnecessarily small even for the manufacture such a precise product as the TIMKEN Bearing, such is not e case. For instance, if the degree of error were 6 seconds d two gauges were required, one for a production line—the her for an inspection line, the possible degree of difference uld be 12 seconds which is equal to 3/5 of .0001" for a ecimen one inch long. We consider this too great.

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Detail of gauge holder and angle blades.

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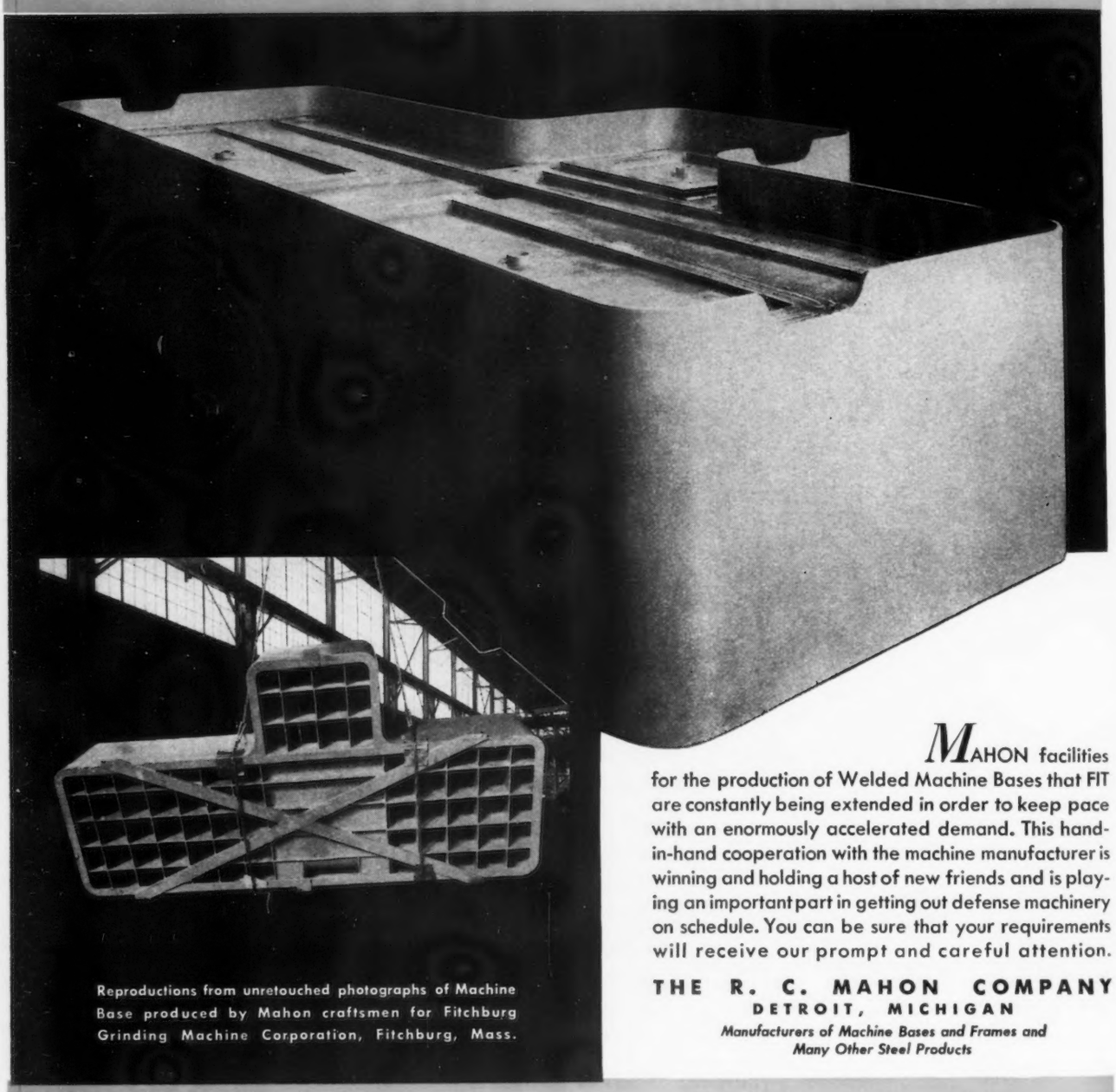
Welded STEEL Machine BASES



Reproductions from unretouched photographs of Machine Base produced by Mahon craftsmen for Fitchburg Grinding Machine Corporation, Fitchburg, Mass.

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THE IRON AGE

OCTOBER 16, 1941

ESTABLISHED 1855

The Goat Hunters

GOAT hunting is a pastime that Americans have indulged in from the beginning of our history and will probably pursue to the end of it.

The idea is to find the goat, shoot him and nail his skin onto your barn with a label reading: "Here is the fellow who was to blame for this and that."

While this is an exciting sport there is very little percentage in it for either the goat or the hunter, or in fact for the public as a whole, since the operation may be described as falling into the class of post mortems. And since goat hunting takes considerable time and necessitates covering a lot of territory as well, it might be well to declare a moratorium on it for the duration of the emergency.

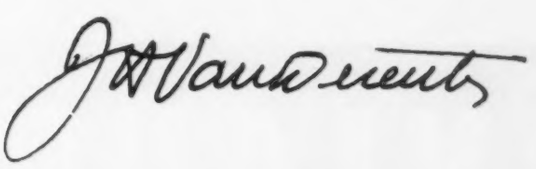
I say this in view of the rumor that a grand and glorious goat hunt is about to be launched to nail private industry's skin to the barn as being chiefly responsible for material shortages, especially steel.

The real goat in this matter is not private industry, nor the Army and Navy, nor the priority officials in Washington, although none of them is immune from legitimate criticism with respect to its handling of these matters. The real culprit who has made us short of steel and aluminum and other needed materials is Mr. Hitler. And I have no objection to nailing his hide to a barn or even a less dignified outbuilding.

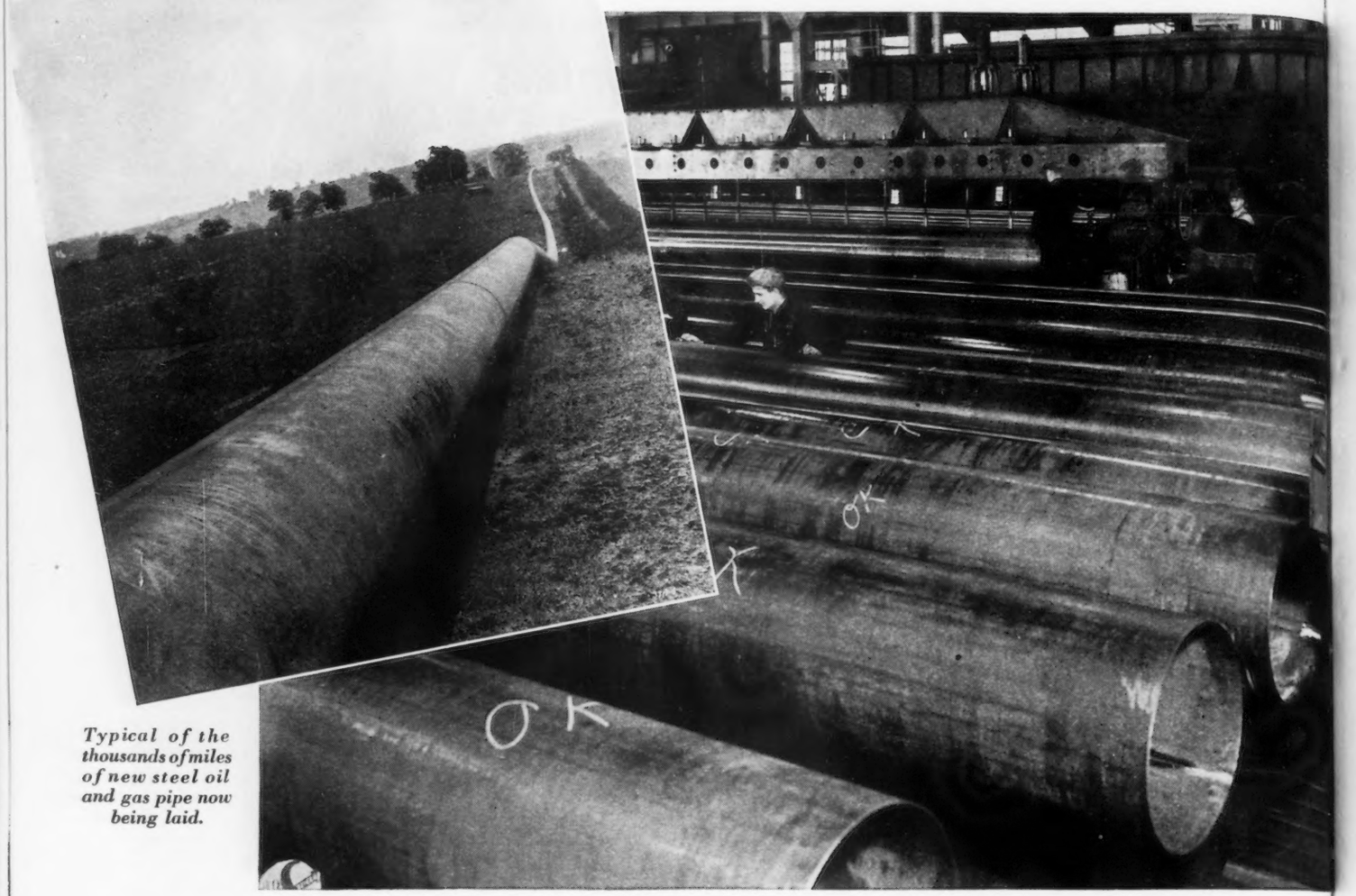
Mr. Hitler has put up to us such a big job that it cannot possibly be done without everybody making plenty of mistakes. Government is bound to make them and so is industry. The main idea is not to call one another names but to get together to try to make less and less of these mistakes as time goes on, and before it is too late.

There has been, undoubtedly, some overbuying of steel on the part of some of those who have been put in position to obtain it through preferential priorities. But government agencies, such as the Army and Navy, are in that boat as well as members of private industry who have defense contracts. And it is quite understandable that people faced with tremendous obligations for output seek to protect their operations by assuring themselves an adequacy of material.

If these gentlemen, public and private alike, have been overzealous in this respect, it has been due to zeal in the public interest and not in the interest of profit. And it can be better remedied by an amicable and frank around-the-table discussion than by instituting an aspersive goat hunt.



Inspecting newly welded gas line pipe in plant of A. O. Smith Corp., Milwaukee, Wis.



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Tool Supervision in the Navy

By FRANK J. OLIVER
Machine Tool Editor, The Iron Age

THIS is the set-up used at the U. S. Naval Gun Factory for control of tools. It should be of interest to both industrial firms and other government yards, which today are being pressed to turn out the maximum in defense goods in a minimum of time.

THE work done at the U. S. Naval Gun Factory, Washington, can best be compared to that of a big job shop or so-called heavy engineering shop, since even the lightest work is heavy compared to general industrial production, and none of the quantities involved are large. Today, when the lots are large in keeping with the greatly enlarged naval building program, such production runs are contracted for with commercial manufacturers. From many angles, the manufacturing problems involved at Washington are quite different from standard commercial practice, but the system devised for meeting the specific conditions of the gun factory should be of general interest, particularly from the point of view of similarity and dissimilarity from industrial manufacturing of a like character. This particular example of tool supervision and maintenance has been selected because the set-up here is extremely effective for its purpose and compares well with best commercial practice.

Tools used at the gun factory are divided into two general classes: Class A and Class B. Class A tools are of a general purpose type, such as drills, reamers, milling cutters, taps, die heads and grinding wheels, also common types of gages, ordinarily purchased from outside vendors against standard specifications. Class B tools cover all special tools, jigs and fixtures not available as standard but usually made up in the yard's own tool shop. To show how the decision is made as to whether or not a tool will be purchased or manufactured, we will describe the tool engineering function here.

Design changes are one of the consistent problems to be met in the shop. More recently, too, the production of many new sizes and types of guns as well as auxiliary equipment has been brought into the gun factory. Let us imagine a new ordnance part is to be produced here and let us trace the decisions as to tooling involved. The determination of the schedule of operations, design of fixtures and selection of tools required for the manufacture of each part all comes under the supervision of the mechanical engineer, who in industry might be termed the chief tool designer. The mechanical engineer heads the so-called S. A. (shop accessories) section adjacent to the tool shop which is a large tool, fixture and gage manufacturing establishment, under separate supervision. This S. A. section is the production engineering or tool engineering department and now employs about 110 tool designers, divided into groups such as tool and cutter, screw machine, jig and fixture, press die, forging die, plastic die, etc.

A proposal is first made as to the method of manufacture and the accessory requirements in terms of

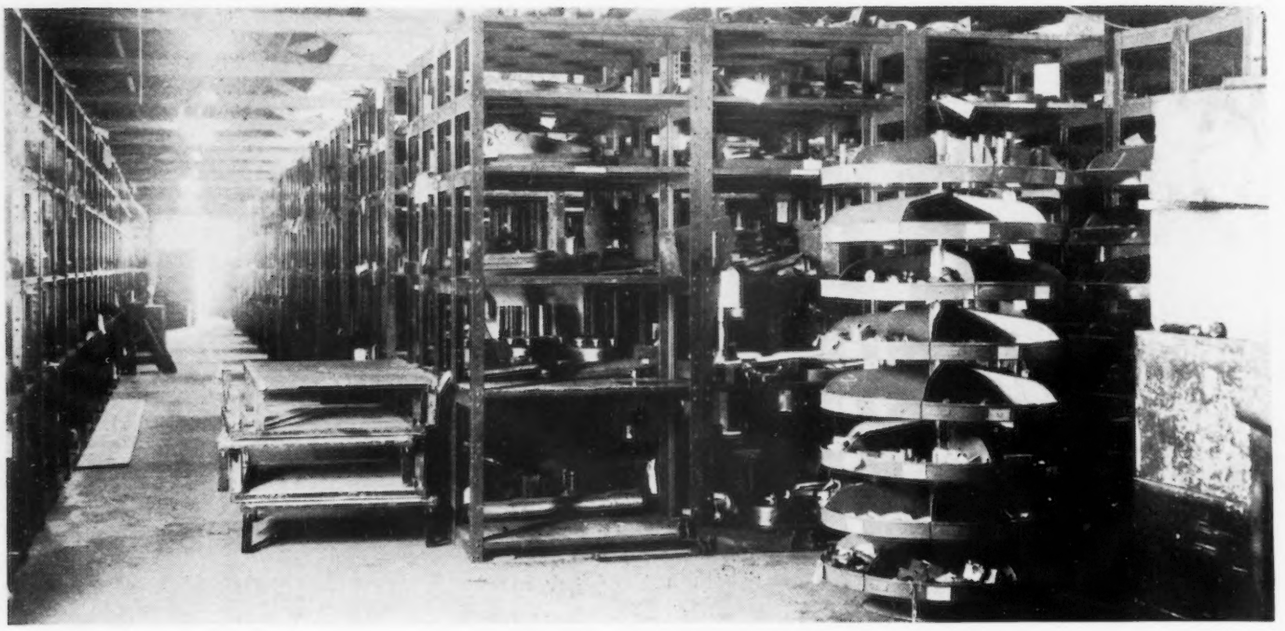


FIG. 1—A section of the storeroom for Class B tools, fixtures and gages at the U. S. Naval Gun Factory. Official U. S. Navy photograph.

special jigs, fixtures and tooling. Almost invariably the tooling is based on existing machine tools which are primarily of a general purpose character. It has been only recently that outside contractors dealing with large quantity lots have gone into special purpose machinery to a certain extent. This method proposal is discussed with the master mechanic of the particular shop involved, and in fact there is constant liaison established between the S. A. section and the shop supervision. Incidentally, each master mechanic who corresponds to a general foreman or superintendent in industry, has a number of supervisors or foremen under him known as quartermen and these in turn have lead men supervising a smaller group. The chief quarterman in some cases is the tool supervisor.

Once the order of operations is determined, a sheet is prepared listing the tool and fixture requirements. Often the fixture is special, but the tools are standard (like drills or boring bars) and this tabulation gives an index of what special tool and fixture drawings will be required. Preliminary assembly drawings of each S. A. tool and fixture are made and these again are checked with the shop master mechanic involved. Then every part is detailed. Standard tools and gages must be available either in stores or in the particular shop tool crib. Ordinarily, the planning department decides whether tools will be purchased on the outside or made in the tool shop.

As a general rule, the choice of fixture design—its simplicity or its complexity—is governed not so much by the quantity of a given production run and desired unit cost, as by the tolerances called for, importance of the workpiece and its relative cost. For example, a rather elaborate boring fixture was recently designed for a bevel gear housing for a precision instrument. Tolerances in "tenths" on the diameters of concentric bores and relative positioning of the two bores at right angles necessitated a box type boring jig that was a 100 per cent job. How many were to be made was a secondary consideration.

These special tools and fixtures covered by S. A. drawing numbers are built and inspected on the same floor with the tool design drafting room. In fact, the rapid expansion of the tool design department in recent years has seen the drafting tables literally flow around the inspection division which finds itself today flanked on both sides by tool designers. The tool shop is immediately adjacent but is not under the supervision of the mechanical engineer. It also has been greatly enlarged and modernized with the best available tool room equipment.

Tool Inspection

In the S.A. tool inspection department, which comes under the jurisdiction of the mechanical engineer, tools are carefully checked for size, shape and hardness. All cutting tools must show a minimum of Rockwell 63 C hardness. Projector type comparators are particularly useful in checking thread gages and special form tools, many of which are special for ordnance work.

Requisitions for tools are pooled in the production department, which exercises general supervision over the whole tool situation, and the individual orders are probably reduced by one-third through consolidation of like items. Bids are then advertised through the supply department. As will be seen later, however, many of the practices are being revised elsewhere in the Navy.

Raw materials for the tool shop, like tool steels and high speed steel are bought through the supply department, and as far as the tool shop is concerned, it merely draws the necessary materials from stores. This material has all been purchased from approved sources established on the basis of tests. By the time the material reaches stores all brand names have disappeared, and the tool shop calls for high speed steel, for example, by Navy Department specification symbols. Tool steels and lathe tool bits are

bought on a competitive quality test, as well as the usual price and specification bidding. These quality tests, involving comparative lengths of tool life when turning nickel steel billets or logs, are made at the Philadelphia yard, which specializes in this purchase procedure.

The Naval Gun Factory has been alert to the possibilities of carbide tools and a number of brands of carbides have been tried out. In connection with specific applications, qualified engineers of carbide suppliers have been given access to the various shops and have been helpful in educating the shop personnel in the use of such tools.

On the other hand, a great deal of the work done here involves interrupted cuts and is done on high tensile alloy steel forgings. Many of these forgings are extremely complicated and involve a large number of man-hours to complete them. By the time such pieces reach the semi-finished stage they are worth thousands of dollars, and from that point on, the saving of a few minutes in subsequent machining time does not count much compared with the risk of possible work spoilage at the higher machining speeds available with carbides.

Tool Crib System

As regards the unit plan of tool control and supervision, it might be pointed out that at the Washington yard there are about 23 shops, of which 10 use machine tools in any quantity. The rest include press, forge, foundry and pattern shops, plating, assembly, physical test laboratory, experimental, etc. In each of the 10 metal cutting shops there is a tool crib which comes under the direction of a tool supervisor, as mentioned in the early part of this article. The tool cribs resemble those found in general industry, but are organized somewhat differently as to the handling of Class A and B tools.

Class A tools of the general purpose type are stored in the cribs as are an assortment of lathe, planer and slotter tools of special shapes carrying an S. A. number but subject to call almost daily. Class B tools in general, however, such as special tools, fixtures and gages, applying to a specific job, are stored separately in a central storeroom after they leave the inspection division of the S. A. department. (Class A tools bought outside are similiarly inspected and released to the cribs by the mechanical engineer.) This central storeroom for Class B tools was formerly a one-story building in the yard, Fig. 1, but has since been transferred to a low ceilinged mezzanine deck of one of the new assembly buildings. When a job is routed through a particular shop, the entire set of Class B tools is issued to the particular shop by the mechanical engineer. At the same time, the tool supervisor sees that all Class A tools needed for that job are in the tool crib and are in good condition.

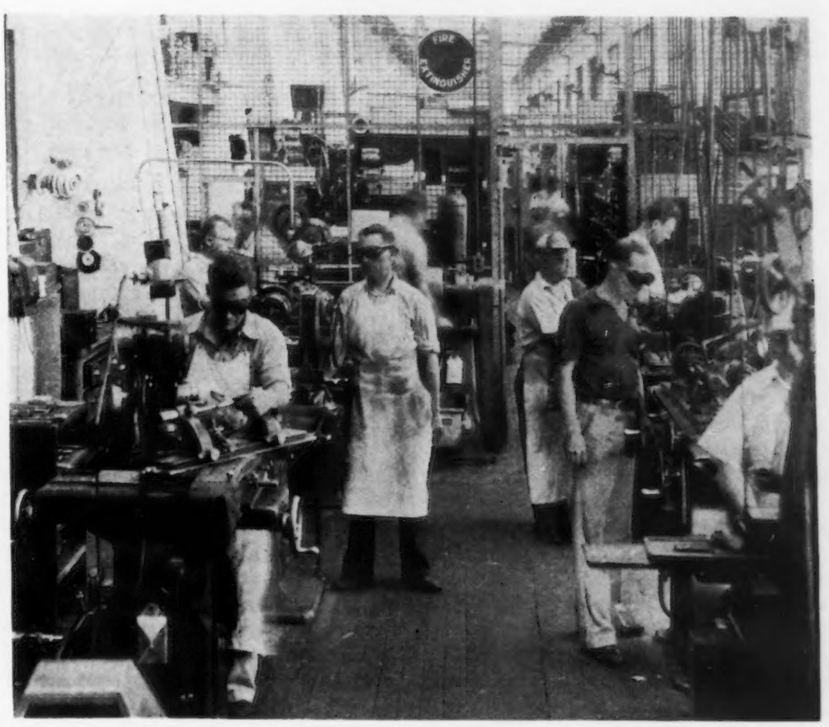
A section of each crib is equipped for tool maintenance. In the tool crib of the breech mechanism shop, Fig. 2, for example, there are three surface grinders, five universal tool and cutter grinders and one drill grinder capable of sharpening up to a 3 in. drill. Aside from being useful for sharpening flat form tools, large flat drill and hog bits, large thread chasers, etc., these surface grinders are also used for production work in finishing some of the flat breech block surfaces. In other shops, the grinding equipment available in the tool crib will vary according to the type of machine tools found in that particular shop. Where large planer and boring mill tools (2 x 2 in.) are used, the equipment will include a Sellers universal tool grinder, Fig. 3, sometimes called a "tub" grinder because of the rotund appearance of its base. With this type of tool grinder, at a single set-up, rake, relief and clearance angles can be ground on lathe or planer tools and round noses or bent noses can be generated with proper clearance around the entire radius.

In the gun shop, special grinding equipment has been installed in one corner of the shop for the maintenance of gun boring tools, including facilities for assembling and turning the oak packing around the boring bits. In fact, this is a small toolmaking department in itself, serving this one shop.

Standard S. A. single point lathe and planer tools are illustrated on a blueprint prominently displayed at the tool crib window and are called for by number. Special tools are called for by the S. A. drawing number or by the complete set. General tools, like drills and milling cutters, lathe bits, etc., are called for by general class and size. A simple brass check sytem is used in issuing tools to each worker.

For the most part, tool grinding is done by the regular tool crib attendants, but individual machinists have access to tool dressing machinery in their shops where necessary. One exception should be noted as far as centralized tool grinding is concerned and that is that several special types of ma-

FIG. 2—A corner of the tool maintenance section of the tool crib in the breech mechanism shop, U. S. Naval Gun Factory. Official U. S. Navy photograph.



chine tools like Gorton profilers, Keller form millers and Gleason gear cutters, all have their own special grinding equipment for tools. This tool maintenance equipment is located adjacent to the machines themselves and is operated by the machinists running these machines.

While a specific order is going through the shop, Class B tools such as special contour end mills and the like, are maintained in sharpened condition by the tool crib, but after the job is through all the Class B tools, fixtures and gages applying to that order are returned to central tool storage. No attempt is made at this time to put the tools in good condition. The chances are that when this job comes through again, some changes in product design may have been found necessary, necessitating modification of the tools, etc. In fact, like most government arsenals, for years the Naval Gun Factory has served as a laboratory for ordnance production methods as well as material design, so that constant change is the regular condition. All extensive revisions in tools and fixtures are done in the central toolroom before the tools are re-issued for the next production run.

With this combination system, flexibility is attained, yet there is practically constant supervision from one central authority—the mechanical engineer, who combines the functions of chief tool designer, methods engineer and tool supervisor. Tool cutting angles are carefully controlled from here and speeds and feeds are selected with the idea of getting the most out of the machine tool equipment without jeopardizing the quality of the work or letting spoilage get out of hand. In fact, in screw machine tooling the S. A. department has gone further than most commercial shops in studying the relation of relief and cutting angles on the performance of the tools in cutting various materials.

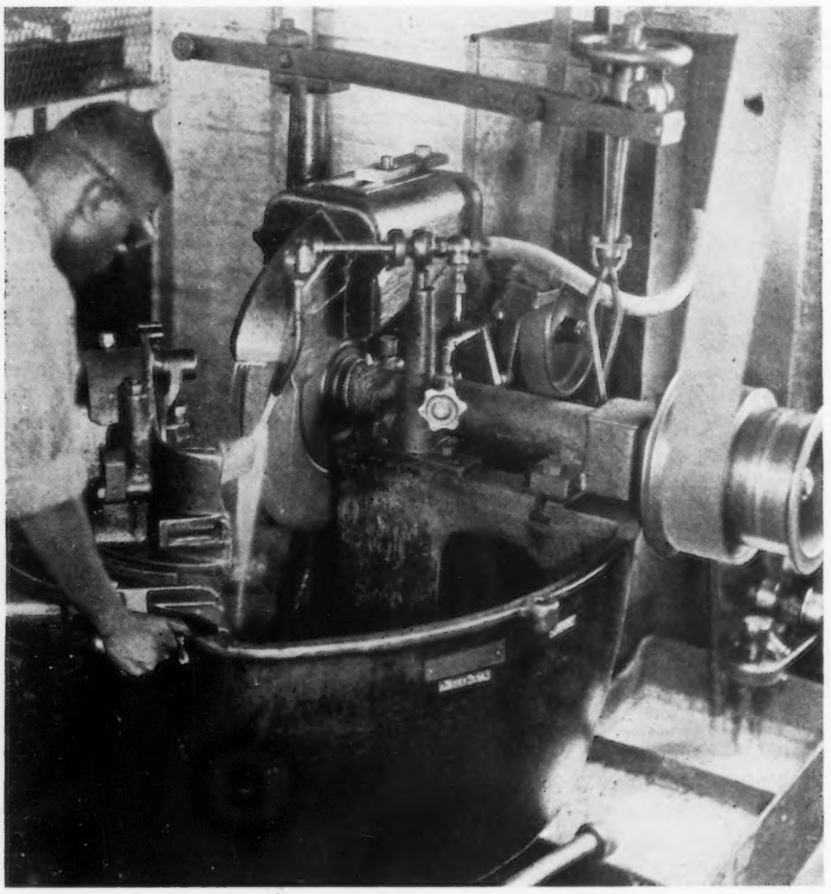


FIG. 3—Control of cutting angles on large size planer and boring mill tools is assured with grinding machines of this type which can be adjusted to present each tool side at the proper angle. Clearance angles can also be generated uniformly around the radii of nose tools. Official U. S. Navy photograph.

A word should be said about tool salvage and conservation of high speed steel. Much effort is directed these days toward the conservation of tungsten, one of our most important strategic materials, and pressure is being applied to manufacturers in general to use at least an equal quantity of the low tungsten, molybdenum high speed steels in place of the 18 per cent tungsten variety. The Washington yard in the last year has recognized one phase of this problem through a regular program of high speed tool salvage.

High Speed Steel Conservation

In general, the Assistant Secretary of the Navy's office has taken cognizance of the critical situation in high tungsten tool steels and is taking a number of steps to conserve this important material in line with the recent order of OPM affecting all buyers of high speed steel. Salvage of worn cutters has already been mentioned. Salvage of high speed steel scrap is a second phase. Big lathe and planer tools made from solid h.s.s. shanks will be reforged and reworked. Whereever possible insert type tool holders using small bits of h.s.s. will be substituted for solid shank tools. Inserted-tooth milling cutters will replace solid end mills wherever practical, and in fact the use of larger diameter-inserted tooth cutters having greater cutting capacity and a broader sweep will be encouraged over small diameter end mills that might have to take two or three passes to completely mill a given flat surface. Furthermore, the yards are being encouraged to use h.s.s. as a tip material brazed into the shank the way carbides are today, particularly in the case of large tools.

A concerted drive is also planned to get the most effective use out of existing machine tool equipment by using tools to their capacity. The order is going out to "roll 'em off blue" when it comes to steel chips produced in various cutting operations. Emphasis will be placed on proper tool grinding practice and control of tool angles. At the Washington yard, this phase is under particularly good supervision. In fact, greater emphasis on proper tool supervision is being stressed throughout all the yards.

Gear Inspection Methods

By DOUGLAS T. HAMILTON
Fellows Gear Shaper Co., Springfield, Vt.

BESIDES reviewing all the conventional methods of spur and helical gear checking, the author establishes many important principles that should be of interest to old as well as newcomers to this phase of gear manufacture. The material presented should be particularly helpful in training both industrial and government inspectors of defense material. Methods of measuring individual tooth elements, like tooth shape, tooth spacing, tooth thickness and eccentricity, are discussed in the first part of this two-part article.

ONE of the many uses for gears is to transmit motion from one shaft to another smoothly and uniformly. This requires that the length of line of action used must be longer than the base pitch (circular pitch transferred to base circle); that there is no interference; that the mating tooth shapes provide conjugate action; that the teeth are evenly spaced; that the contacting tooth surfaces have a smooth finish, and that the gears be reasonably concentric. Elaborating upon these requirements, the teeth should be of sufficient length to assure a line of action equal to or greater in length than 1¼ times the base pitch. The proportion of this tooth element is a matter of design although certain manufacturing errors can defeat its successful obtainment, such as too much tip relief, irregular tooth spacing, errors in gear mounting, etc. Uneven tooth spacing causes the driven gear to alternately accelerate and decelerate as the mating teeth come into and go out of mesh.

Tooth shapes which do not provide conjugate action have a similar effect, and this is especially so if the involute profile is not of sufficient length to obtain a line of action that is greater in length than the base pitch. Interference is contact of the teeth at some point other than along the theoretical line of action and can result from improper tooth design, inaccurate cutting, and mounting gears at a shorter center distance than that for which they were intended. Interference is a serious source of vibration, and hence, contributes to noisy operation. A smooth finish on the working surface of the gear teeth is highly desirable if quiet operation is demanded. All of these points will be discussed more fully later.

The method best suited to checking gears is to a large extent governed by two basic objectives, namely checking an original design to determine if specifications have been adhered to, and checking gears produced in quantity where manufacturing tolerances must be met. Checking an original design would comprise principally a check on the individual tooth elements, whereas checking gears in production would involve checking of errors in combination rather than separately.

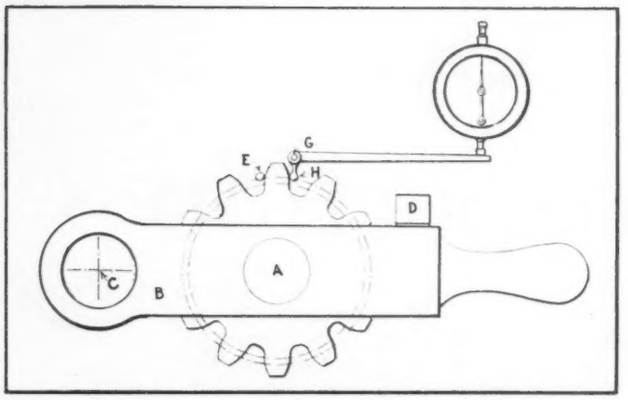
For the first class of gear, from the standpoint of inspection, the chief elements in the order of their importance are: Tooth shape, tooth spacing, tooth thickness and eccentricity. Helical gears introduce a fifth element—helix angle. Devices that fulfill requirements to be met under the first classification include gear tooth calipers, templates, pin gages, etc. In the second classification would be testing fixtures, employing needle indicator or dial gages, master gears in combination with recording devices, gear speeders, etc.

Measurement of Tooth Elements

The securing of accurate measurements of tooth elements would apparently seem to be a simple proposition. This is far, however, from being the case unless all of the conditions involved are clearly understood. As a general rule, in checking gears, actual measurements are not made. Instead the variations in tooth thickness, space width, and circular pitch are checked by taking relative readings.

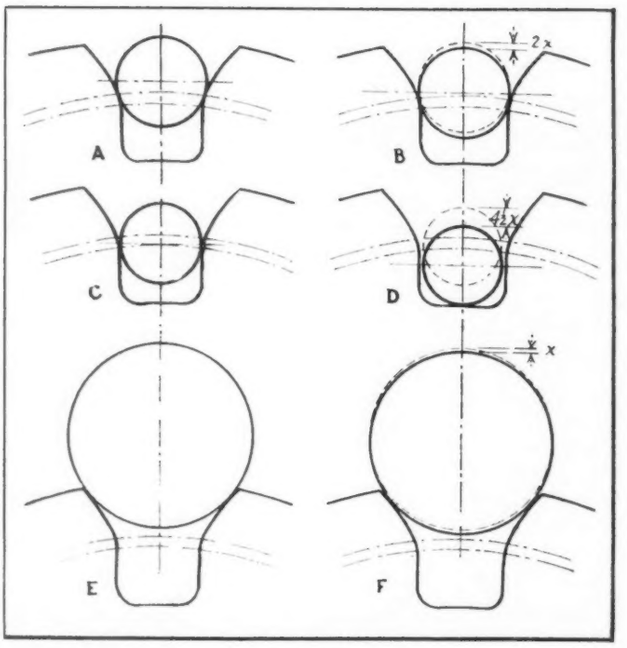
When the gear checking fixture is set for obtaining relative readings of tooth thickness and circular pitch, etc., these are generally taken in the vicinity of the pitch line. For instance, the thickness of the tooth is sometimes measured from the top of the tooth by means of a template or gear tooth caliper. It can readily be seen that the outside diameter, concentricity with respect to the bore, the number of teeth, pitch, etc., all affect this dimension and make necessary the introduction of certain corrective factors. Sometimes these factors are very simple and can be safely used. Often, however, the results are so complex that perfect correction is almost impossible.

Another method for checking tooth thickness, or space width, requires the use of a micrometer fitted with V-blocks representing rack teeth, these fitting in the tooth spaces. These special micrometer anvils are made to the desired pressure angle, and when properly applied, give the diameter of the pitch circle. This method has certain disadvantages in that a wide space opposite a narrow space might show the correct overall dimension, but at the same time not indicate the error. In addition if the involutes were not correct, the measurement would not equal the pitch diameter, notwithstanding the fact that the spacing might be perfect. The practice of measuring these dimensions at a constant distance from the center of the hole eliminates many



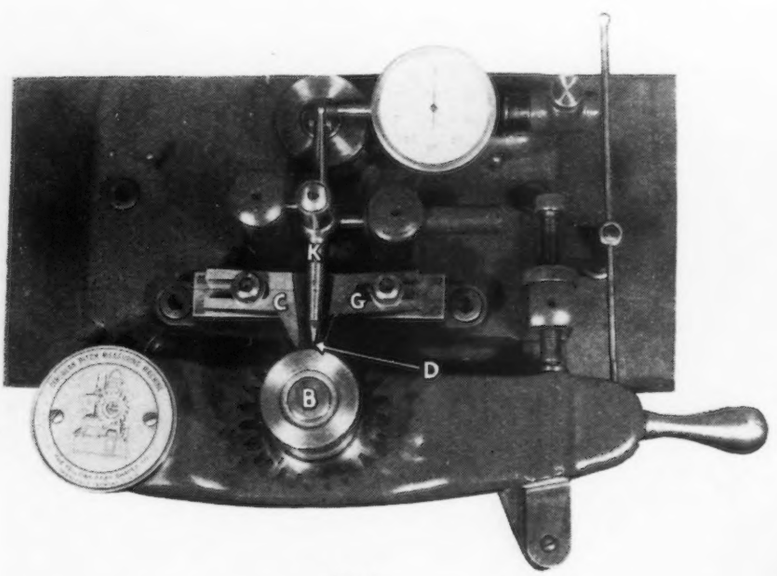
ABOVE

FIG. 1—Method of measuring gear tooth thickness. Gear to be tested is mounted on stud *A*. Handle *B* moves about center *C* and contacts stop *D*. The tooth to be measured is located between the points *E* and *H*. *E* is a fixed stop and *H* is free to move about its center *G* on the arm contacting the dial indicator. The same fixture can also be used to check the width of the space by simply bringing *E* and *H* closer together so that they will enter a space with *E* contacting one side and *H* the other. The necessary adjustments should be made at *D* to allow *E* and *H* to touch the teeth in the proximity of the pitch line.



ABOVE

FIG. 2—The diameter of the ball is of great importance in checking eccentricity by the ball method. If too small a ball is used, then small errors in spacing greatly affect the reading since a small error will allow the ball to enter almost to the bottom of the tooth spacing, as shown at *C* and *D*, and the eccentricity factor will have very little effect upon the indicator. As large a ball as possible should be used, as shown at *E* and *F*, to minimize the effect of spacing errors.



ABOVE

FIG. 3—Circular pitch testing fixture. The gear is held on stud *B* carried in a fulcrumed arm. One side of the tooth is brought in contact with fixed stop *C*, being held against this stop by a spring block *G*. The contact pointer *D* carried in lever *K* is brought in contact with the adjacent side of the following tooth. Any error in tooth spacing is registered on the dial indicator which is operated by Lever *K*.

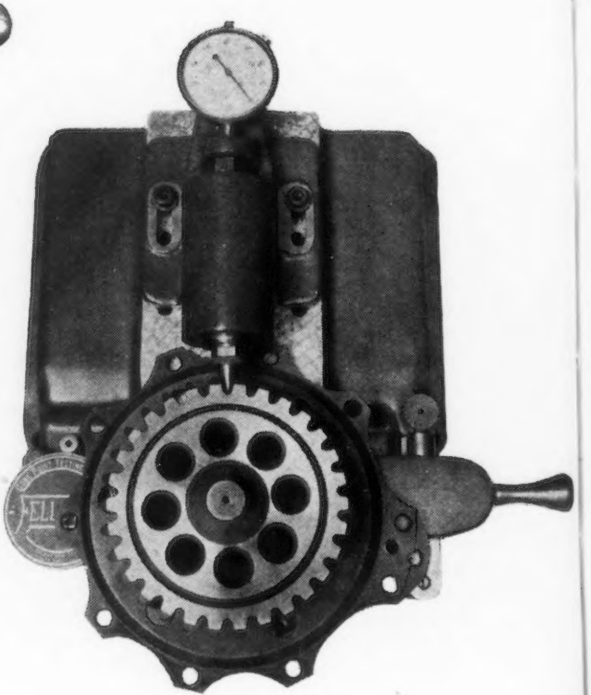


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FIG. 4—Cone-point testing fixture for checking concentricity of the pitch circle. The gear to be checked is held on a fixed stud and is free to rotate on the latter. The stud is retained in a fulcrumed arm. The cone pointer, which is in the form of a rack tooth, is held in a spring actuated plunger, that contacts the plunger of the dial indicator. The cone pointer is located in the tooth space, the arm being located by a fixed stop, and errors are reflected on the dial indicator.

of these objections. This method of thickness inspection is shown in Fig. 1. While this method may not be absolute, when only one of the points is free to move, the correction is so slight that it can be safely neglected.

Sometimes an exact measurement is made on the pitch circle, but usually little attention is paid to this and comparative readings are taken on any circle. This in itself would not be serious were it not for the fact that very often one of the contacting points is on one circle and the other contacting point is on a different circle, so that the distance measured may not be the circular pitch chord. We may get a relative spacing test, but the errors indicated may not be spacing errors. They may be variations in the involute profile. Variations in the profile, of course, could be checked by taking tests on various points on the tooth. For instance, one near the pitch line and others near the top and bottom of the tooth. If, however, the variations in circular pitch are to be compared with tooth thickness and space-width reading, all measurements should be taken on the same circle.

Checking Eccentricity

The eccentricity of the gear is often checked by placing a ball in each space and noting changes in the distance from the center of the bore to the points of contact. Obviously this reading is affected by errors in spacing, as well as profile, and is usually indicated by abrupt changes, whereas, eccentricity alone causes a regular movement of the needle from zero to the highest reading and then back again to zero in one revolution of the gear. The diameter of the ball is of greatest importance. If the ball is so small that it contacts near the bottom of the tooth space, as shown at *C* and *D* in Fig. 2, the movements of the indicator needle are very easily misinterpreted. It will be seen that a slight spacing error will allow the ball to enter the space to considerable depth, and the eccentricity of the gear will have very little effect on the indicator. In order that eccentricity may have a greater effect on the indicator than errors in spacing, the largest possible ball should be used, as shown at *E* and *F*. The same general conditions are present if a master rack tooth is used, and when the included angle of which does not equal twice the pressure angle of the gear tooth. If the included angle of the rack is less, for the same spacing error, the rack tooth enters a little further.

A condition not always appreciated is that the point of contact on the tooth surface changes with every variation in spacing if the ball is used, but it does not change with a rack tooth. With a ball, the line of action always passes through the center of the ball and tangent to the base circle. As the ball changes its position with respect to the center of the gear, the angle of

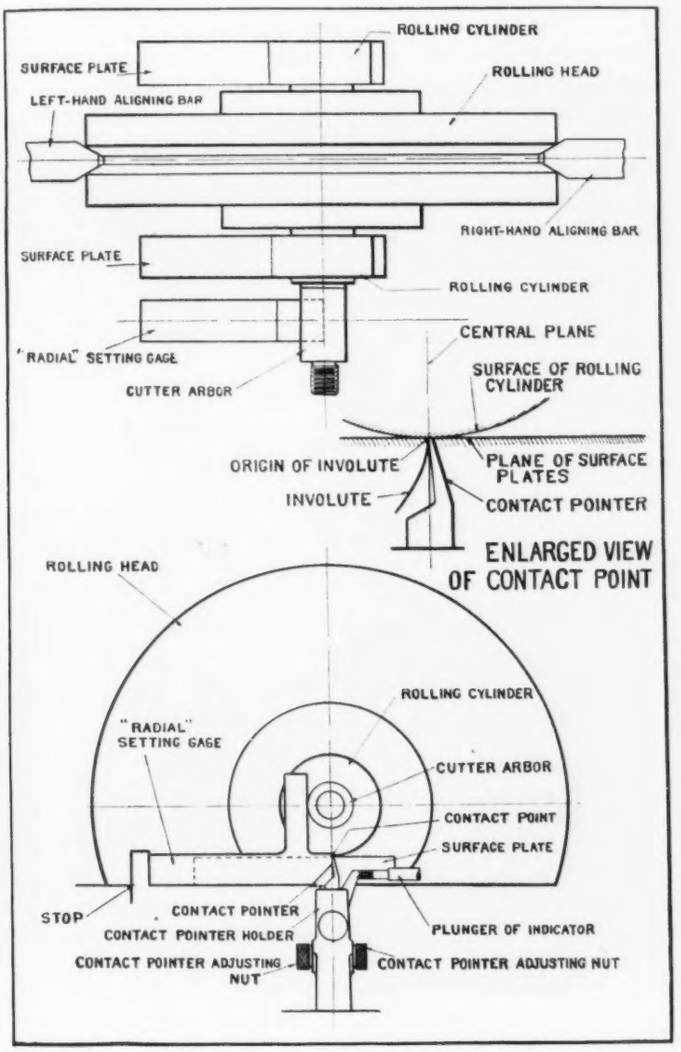

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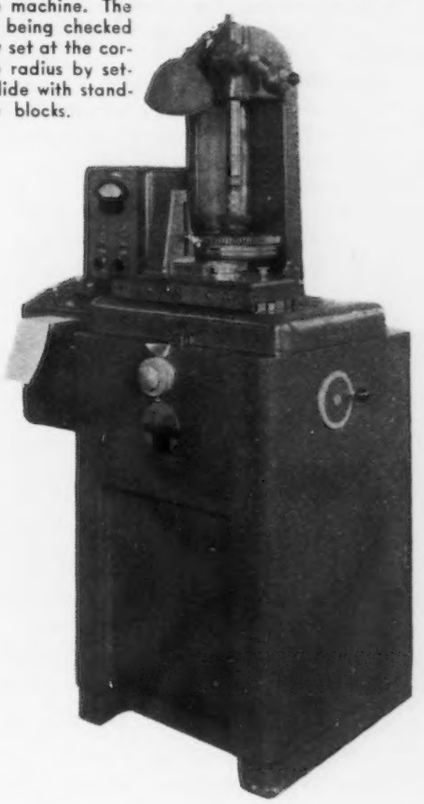
FIG. 5—This device for checking the involute profile of the gear tooth employs two base circle cylinders. As the head carrying the two rolls is rolled along the straight edges without slippage, any errors in profile are transferred to the dial gage shown.

BELOW

FIG. 6—Instrument for checking involute profiles, the principle of operation of which is based upon a master involute cam developed from a larger base circle than the maximum capacity of the machine. The involute profile being checked is automatically set at the correct base circle radius by setting the main slide with standard size blocks.



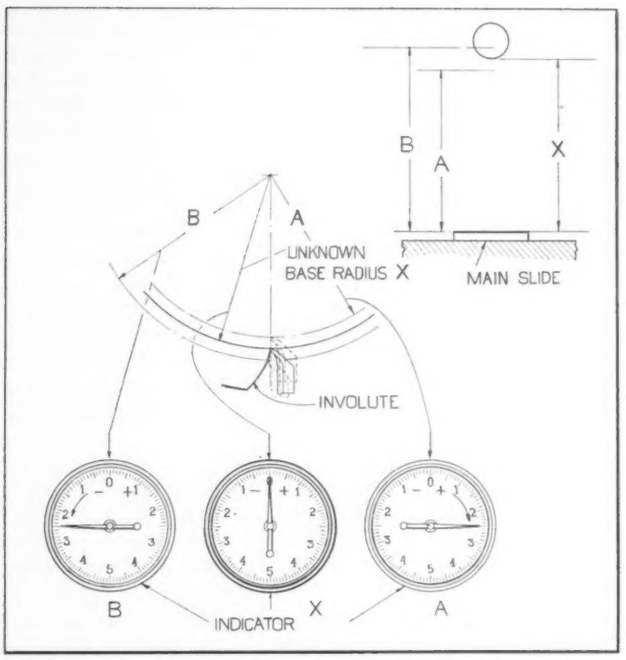


FIG. 7—The involute checker shown in Fig. 6 can also be used for determining the diameter of a base circle that is unknown. The pointer is placed slightly outside the junction of the tooth profile and the fillet, and the main slide is adjusted back and forth until the smallest amount of indicator movement is noted. The base radius *X* can then be measured with size blocks.

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the line of action is also changed. In the case of a rack tooth, the line of action is always perpendicular to the side of the tooth, and, therefore, is constant.

The following conclusions may be drawn from the principles presented above:

1. To check eccentricity, the point of contact of ball or rack tooth should be as near as possible to the outer ends of the teeth.

2. To check spacing, the points of contact should be nearer the pitch circle.

3. Comparative readings cannot be obtained on different testing fixtures unless the diameter of the ball is the same on both machines.

4. Comparative readings cannot be obtained on different testing fixtures unless the included angle of the rack tooth is the same on both machines.

Sometimes a gear is tested for eccentricity by engaging it with its mating member, without backlash, and by noting the changes in center distance as the teeth of the two gears pass through mesh. It is conceivable that the eccentricity of one might offset the eccentricity of the other. Often the second gear is a master of known proportions and accuracy. While this method is fairly reliable, it should be pointed out that all changes in center distances are not entirely due to eccentricity, as the other teeth in the arc of action influence the movement of the free stud. This method is likewise affected by errors in spacing and in profiles.

The "base pitch" is the length of the arc on the base circle corresponding to the circular pitch. If the involutes are correct, the distance between the profiles is the same on any straight line which intersects both curves and is tangent to the base circle. If this dimension is used to compare the spacing or profiles, the measurement should be taken at several points along the tooth surface. It should be evident from the statements made in the foregoing, that there are many conditions to consider in the checking of gears and that the inspector should have not only an analytical mind, but be fairly well versed in the principles of involute curve and its application to gear teeth. Also that he should thoroughly understand the requirements demanded.

Special Conditions

For instance, assume that a pair of gears are to be checked which are to be installed in a reduction unit for an airplane propeller. Here is one case where the gears will be under maximum load practically all of the time, and because they must be as light as possible, extremely high factors of safety cannot be adopted. These conditions necessitate extreme accuracy in the gears if they are to withstand the high tooth pressures that must be carried. Gears which are to operate at high speeds should be accurate

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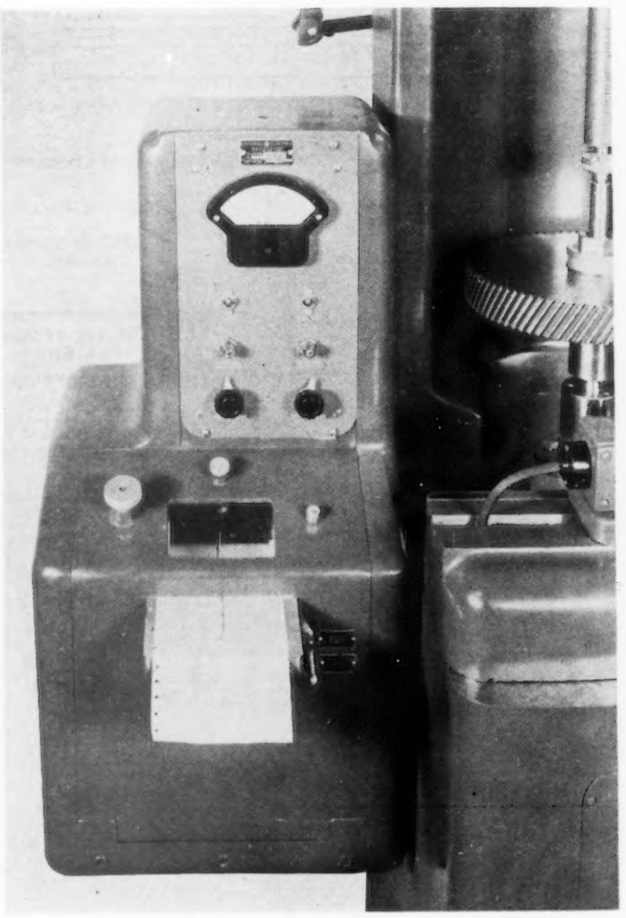

FIG. 8—Close-up of the machine as shown in Fig. 6 equipped with an electric recording device so that a permanent record of the deviations from a true involute profile can be made.

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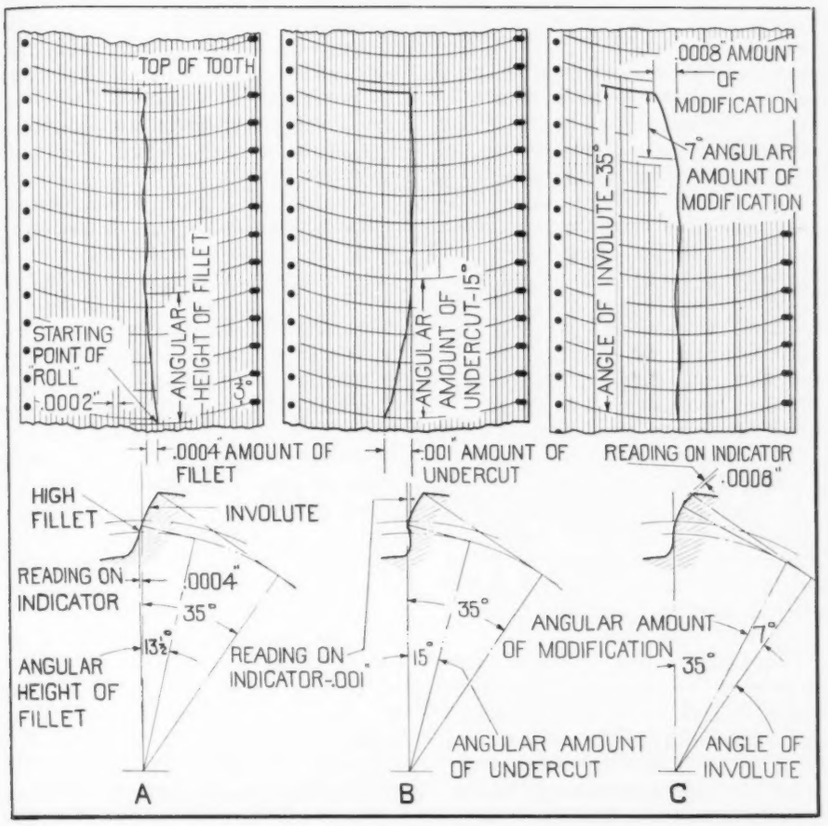

FIG. 9—Characteristic errors in tooth profile recorded on the chart of the machine shown in Fig. 8. Chart *A* plots the amount and height of a high fillet. Chart *B* illustrates the effect of undercut. Chart *C* shows variations from the true profile due to tip relief.

in two important points: Tooth spacing should be as nearly uniform as possible, and the tooth shape should be uniform from the point where the teeth first make contact to where they break contact. In other words the power should be transmitted smoothly and at a constant velocity. The question of eccentricity, while important, is not as vital, but less eccentricity can be tolerated in high speed gearing than in gears operating at comparatively low speeds. It should also be mentioned that errors in gears have a tendency to cause vibration, and vibration is destructive to the tooth surface and also is a contributing factor to noisy operation.

As previously mentioned, the two most important points in the checking of gears, that is, as far as the teeth are concerned, are the spacing of the teeth and the tooth profile. Some of the principles involved in the checking of these elements have previously been covered. We will now discuss devices used for checking.

Testing Circular Pitch

This fixture is generally termed a circular pitch testing fixture. It has a fixed stop against which the gear tooth is brought to bear, a fulcrumed pointer which contacts the same side of the adjacent tooth, and a spring block to hold the work in place. The fulcrumed pointer operates a dial indicator. The principle is illustrated diagrammatically in Fig. 3. All of the teeth of the gear are checked by withdrawing the fulcrumed arm and indexing the gear on the stud.

For checking the circular pitch of internal gears, the same principle for mounting the contact pointer is employed and the apparatus is attached to a swinging arm which can be swung outward to permit removal and insertion of the work. The position of this swinging arm can be definitely set to check gears of various diameters within a certain range by means of an adjustable stop.

Concentricity of the pitch circle can be checked by a device known as a cone-point testing fixture shown in Fig. 4. As has previously been mentioned, errors in spacing, as well as profile, affect this concentricity test. It should be stated, however, that this is a very delicate test as it shows up combination errors which would not necessarily be revealed by a measuring device which contacted only one side of the tooth at a time.

Checking Tooth Profile

In order to check the profile of a gear tooth, it is essential that the mechanism used for this purpose be accurately made. Since the involute is a curve traced by a point in a string as it is unwound from a cylinder, known as the base circle, any mechanism which employs this basic principle can be relied upon to check involute profiles. One method is illustrated diagrammatically in Fig. 5. It comprises a rolling head carrying an arbor on which two rolling cylinders are at-

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FIG. 10—Where the origin of the profile lies inside the root circle of the gear, the involute pointer must be set in a tangent plane and offset from the radial position as shown at *B*, since it cannot be placed at the theoretical point of origin at *A*.

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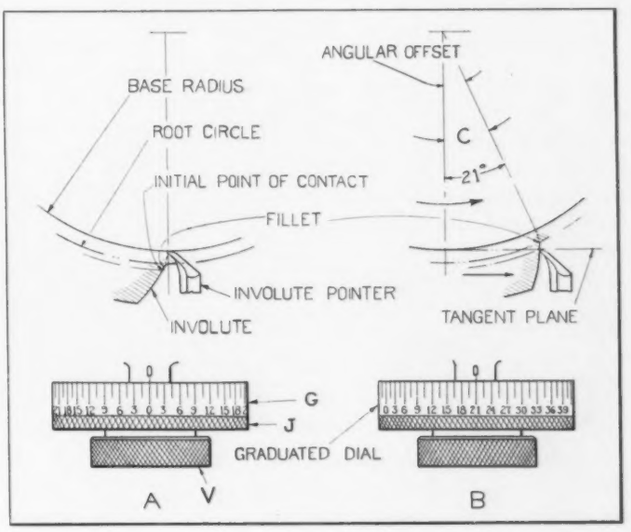

tached, the diameter of these rolling cylinders being the same as the base circle of the involute to be checked. These rolling cylinders travel on two surface plates that are in exact parallelism with each other. The involute pointer which contacts the involute to be measured is first set in what is known as the "radial" position at the point of origin of the involute.

As the head carrying the two rolls is rolled along the straight edges without slippage, any errors in the profile are transferred by the pointer to a dial gage, as indicated. If the involute is perfect, the needle on the indicator remains at zero. The only objection to this method is that separate rolls must be employed for checking each different involute. In other words, the rolls must be the same diameter as the base circle from which the involute is developed.

A machine for checking involute profiles which eliminates objectionable base rolls is illustrated in Fig. 6. The principle employed is based on the use of a master involute cam developed from a larger base circle than the maximum capacity of the machine. By setting the position of the main slide with standard size blocks, the pointer contacting the involute profile being checked is automatically located at the correct base circle radius. A setting plug locates the involute pointer in the so-called "starting" position. Provision is also made for checking tooth modifications through a graduated dial which rotates with the work and indicates the included angle of involute profile. This dial in conjunction with the 0.0001 in. dial indicator enables the inspector to determine accurately the errors in profile and the angular location of the errors.

This machine greatly simplifies the checking of involute profiles. Two methods can be employed. First, the errors can be observed on the dial indicator and graduated dial in the manner just explained. Second, the readings can be permanently recorded on a paper chart in which case any deviations from a straight line represent a departure from the theoretical profile. The angular position of the errors is recorded with reference to coordinate axes.

Measuring Base Circle Diameter

In addition to being more flexible than other devices used for checking profiles, this machine can also be used for determining the diameter of a base circle that is unknown. This is accomplished in a very simple manner as is shown in Fig. 7. Assuming that the machine has previously been set up, that is, that the involute pointer has been set accurately to the master supplied with the machine, and the gear to be checked is examined and the junction point of the tooth profile and fillet, or the undercut, is noted. If this point lies some distance from the root circle, it is evident that no offset of the pointer will be necessary. The work is placed between the centers, the pointer placed slightly outside the junction of the two curves, and the gear "rolled." In "rolling," the main slide is adjusted back and forth until the smallest amount of indicator needle movement is noted. The base radius X can then be measured with size blocks.

This same machine can be provided with an electrical recording device, Fig. 8, so that a permanent record of the involute profile can be made. The recording mechanism comprises a constant-voltage transformer; power unit and an electric head, the latter being attached to the indicator slide. The movement of the involute pointer contacting the tooth profile is magnified through an a.c. bridge circuit containing four inductances. A steel armature fastened to the lever system, containing the dial indicator, is moved directly by the movement of the involute pointer attached to the lever system, and moves between the two coils, thus varying the inductance of these two coils. The other two bridge inductances are in the power unit with a transformer for supplying low voltage to the bridge system. There are also vacuum tube rectifiers and amplifiers for magnifying the bridge unbalance, and controlling the movement of the charting pen, which produces a record on the mechanically driven charting paper.

Effect of Machining Errors

Fig. 9 shows three charts as made on this machine with a diagram under each chart indicating what are known as high fillet, undercut and tip modification. The horizontal rules on this chart indicate a movement of the recording pen that represents 0.0002 in., whereas the coordinate lines are spaced 3 deg. apart. The diagram at A illustrates a high fillet, and this might possibly cause interference so that it is essential that the angular amount as well as the height of this fillet be accurately determined. The electrical recording device automatically charts the amount and height of the fillet.

When cutting gears having small numbers of teeth, and especially with small pressure angles, undercut is generally present, and it is desirable to know if this undercut is sufficient to seriously affect the length of the line of action. Chart B illustrates the effect of undercut.

Sometimes it is required that the tip of the tooth be relieved, either to avoid interference or to take care of tooth deflection. It is important that the angular location and the amount of this modification be known in order to determine if continuous action will result. If the angle of involute required to give the desired length of action is known, this machine can be used to determine if the requirements had been met. Chart C gives this data.

Another point in connection with checking involute profiles is that of checking one where the origin of the profile lies inside the root circle of the gear. It is obvious that in checking the tooth at A, Fig. 10, the involute pointer cannot start at the point of involute origin as this lies inside the root circle. The pointer, therefore, must be set in a tangent plane and offset from the radial position as shown at B. If the initial point of contact is known, the machine can be set to the angular offset before checking the gear.

When the initial point of contact is unknown, the profile can be checked by slowly moving the pointer toward the root circle of the gear, using the handwheel, and keeping the pointer away from contact with the tooth until the pointer reaches the junction point of involute profile and fillet. The graduated dial will then indicate the angular amount of offset, providing the graduated dial at the front of the machine has previously been set at zero, when the involute pointer is in the "radial" position. It is, of course, advisable to roll the gear a slight amount to be certain that the pointer is at the junction point of involute and fillet and not inside or outside that point. The adjustable stop limiting the travel to the starting point is then set if checks on other teeth are to be taken.

(To be concluded)

Here is How a Small Plant

Forges 81-mm. Mortar Shells

By CHARLES C. BARRENBRUGGE
Designing Engineer, Portland Forge & Foundry Co., Portland, Ind.

THE Portland Forge & Foundry Co., a small plant with less than 200 employees, is proud of its achievement to be among the first to produce the 81-mm. trench mortar shell forging, said to be the most complicated hollow forging ever produced on an upsetter. This forge shop has 30 years of forging experience behind it, however, and normally forges about 10 per cent of all alloy steel manufactured for forging purposes. The company's engineers are assisting numerous other plants throughout the nation in solving their problems in shell production.

DURING the summer of 1940, the U. S. Government was making a survey of all manufacturing facilities throughout the country so it might have a record of all available industry which could be used in the production of armaments to meet the ever growing emergency. Educational orders were being placed with various concerns throughout the nation. New methods of shell production were being studied. The methods and practices of the First World War had become obsolete. After 20 years of mass production to become the world's greatest producer of automobiles, radios, refrigerators, etc., American industry was ready to meet the challenge.

Eager to do its part toward national defense, the Portland Forge & Foundry Co., without an educational order or expense to the government, began experiments to produce an 81-mm. shell forging completely nosed, as shown in Fig. 1. Previous to this time, the shell was made from a casting or forged with an open end and nosed after rough machining. About 1938, an upset method was developed to make this shell on a 5-in. forging machine. Although several good forgings were produced, it was found that the method was unreliable from a production standpoint.

Because the inside cavity of the shell had to be held to an 0.020-in. tolerance, many manufacturers were of the opinion that this could not be accomplished without precision machinery.

Hence, attempts were made first to purchase a new upset forging machine for this job, but it was impossible to get delivery until March, 1941. Portland Forge engineers were determined, however, to develop a new and reliable method of producing this shell, even on old equipment, since this was a race against time. Actually, a 5-in. Ajax forging machine of the 1920 vintage was employed. To overcome the many disadvantages of such an old forging ma-

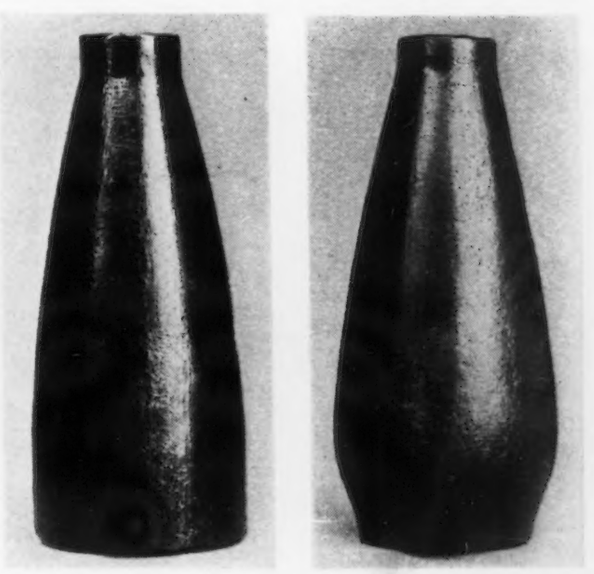

FIG. 1—(Left) 81-mm. shell forging as made by old method required rough machining before being nosed. (Right) New upset method completely noses shell as forged.

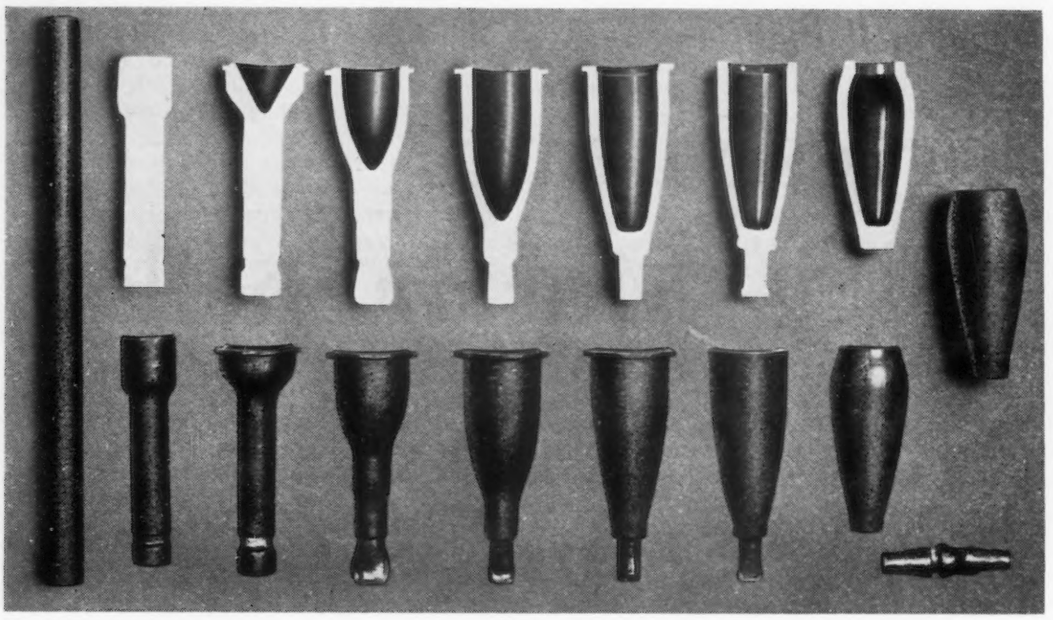

FIG. 2 — Progressive steps in the forging of an 81-mm. shell in an upset forging machine by the displacement piercing method. Two shells are forged, one from each end of a single bar 1¾ in. diameter x 23 in. long. The only loss of material is the small piece shown in the lower right hand corner and the collar trimmed from each forging before nosing.

chine, it was necessary to make up the difference in good die and punch design.

The shell forging is completed in seven passes as shown in Fig. 2 using 1¾ in. diameter stock. The shell bars are sawed approximately 23 in. long, suitable for forging two shells which are upset from each end of the bar.

The first punch and die upset the stock and neck-in the middle of the bar. This preliminary upsetting and nicking of the stock is done in order to assure the proper centering and forming of an even collar which is necessary in the following operations for sound concentric forgings. The second punch pierces the billet which is held and centered by its necked-in part and by the collar on the upset end. The third and fourth punches gradually expand and elongate the cavity in the forging. The fifth punch sizes the shell from the outside and the inside. In the sixth pass the collar on the front of the forging is trimmed off. On the last or seventh pass, the shell is nosed and cut from the bar at the same time. It rolls out the side of the machine on to a conveyor which takes it to a bench where it is hot-inspected.

The inspector then places it on a pin-type conveyor which makes it possible for the air to circulate freely around each shell, thus assuring that the physical properties of each forging are the same. Each conveyor hook has two pairs of pins, one above the other, holding four forgings in all. By the time the shell reaches the final inspection room, it is completely cooled. Here the shells are given a 100 per cent inspection before they are passed on to the shot blast machine which cleans the inside cavity at the rate of two every 30 sec. After the cleaning operation they are oiled inside with a pressure gun sprayer to protect the interior from rust while in transit to the machining contractor.

Today, this typical small industry of the Middle West is now in full production equipped with the latest type of forging machinery and machine tools. The upset forging is performed on a new 4-in. Acme machine. The layout is extremely compact, with a minimum of manual handling between conveyor carriers and machines. So simple is the set-up, that only three men are actually needed to produce the forging, namely, the forging machine operator, the heater, and the inspector. Production ranges from 80 to 100 per hr. with an average of 600 to 700 for an 8-hr. shift. This rate could be stepped up about 20 per cent, but it would decrease considerably the tool and die life.

FIG. 3—Inspector placing shell on pin type conveyor. This type of conveyor allows the air to circulate freely around the shell while cooling, thus producing a uniform microstructure of the steel and making the physical properties of each forging the same.

The first four and last two punches are made from a treated alloy die steel, and are not heat treated after machining. They will run from 20,000 to 25,000 forgings. The fifth punch is made from Durodi and treated to a hardness of about 64 scleroscope. Its life is about 8000 shells. All the dies are the inserted type, making it very easy to replace a worn cavity. The water cooling and the proper lubrication of the punches before making each forging are as essential as the accurate tool and die design.

Durodi is a special alloy steel containing chromium, nickel and molybdenum, made by A. Finkl & Sons Co., Chicago. —Ed.

An oil fired furnace is used to heat the steel billets to a temperature of 2100 deg. F. The furnace is three times larger than is needed to heat the amount of steel necessary to keep the forging machine running at 100 shells per hr. This large capacity furnace is probably the reason Portland Forge never experienced any trouble forging SAE X1314 steel. This material caused other manufacturers so much grief that it was necessary for the Ordnance Department to change the steel specification to SAE X1335.

This small industry which normally forges about 10 per cent of all alloy steel manufactured for forging purposes, is today among the few who have produced the 81-mm. shell on a mass production basis. About 80 per cent of the output of the entire plant is for defense. Forgings for tanks, army trucks, gun carriages, machine tools, etc., are going from the plant in a steady stream to various points in the nation as evidence that small industry is playing an important part in the defense program.

FIG. 4—By the time the shells reach the inspection room they are completely cooled. Here a U. S. Ordnance Department inspector is seen giving the shells 100 per cent inspection with various type of gages. Note the simple form of pin stands for dial indicating the amount of eccentricity, etc.

RIGHT

FIG. 6—This is an 81-mm. trench bomb completely machined and painted, with tail-piece attached. It is ready for shipment to an arsenal to be filled with explosive.

BELOW

FIG. 5—This shot-blast machine cleans the interior of the shells at the rate of two every 30 sec. After this, the cavities are sprayed with oil.

European Munitions

By MARCEL ZINTY
Mechanical Engineer, Magnus Chemical Co., Garwood, N. J.

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THROUGHOUT munitions manufacturing processes the various metal cleaning operations required are indispensable and numerous. A physically clean surface is necessary before munitions can receive intermediate or final treatments, such as: cleaning before annealing, washing and pickling after annealing and before drawing, cleaning before lacquering or painting, etc.

The cleaning methods used in the last war are not applicable today, because production demands are greater and radical changes in the technique of production have made necessary corresponding changes in cleaning means and material.

It might then be interesting to review the latest methods actually used in Europe in the present war for the cleaning of munitions during and after the manufacturing process, because these operations are too often considered as of secondary importance and are therefore more or less neglected despite their vital functions.

No attempt is made here to describe all of the various methods used in different European countries, as they may vary slightly in technique. Such a detailed description would be confusing and of no practical interest. We have consequently limited the following data to what should be called: A Summary of European Practice in the Cleaning of Munitions During and After Their Manufacture.

Generally speaking, the different types of munitions rounds or units are shown in Table I.

All of the integral parts of munitions in Table I that are in *italics* have to be cleaned at some stage of the manufacturing process. For the purpose of discussion, these units are considered under the following major heads:

Class A: Shell, bomb, and grenade bodies.
Class B: Cases for shells and cartridges, jackets for bullets, cups and anvils for primers, and cases for anti-tank and land mines.
Class C: Fuses, detonators, and bullet cores.

These munition parts may be made of steel, cast iron, brass, copper, lead, aluminum, tin, and other alloys. Roughly six different manufacturing operations are involved in the making of a complete munitions unit ready for firing. Artillery ammunitions are usually made in a number of different plants, but as a rule, machine gun and rifle rounds are made completely in one plant. Following are the six fundamental manufacturing operations: (1) the foundry or forging operation for the bodies of projectiles (shell, bomb and grenade); (2) the machining operations for finishing these bodies; (3) drawing operations for shell and cartridge cases, jackets, cups and anvils, and land mine cases; (4) the precision metal working operations for fuses, detonators and bullet cores; (5)

TABLE I
Classification of Munitions

Artillery Munitions:

Shell	*Shell Body*, *Fuse*, Exploding Charge		Gun Round
Primer	*Cup*, Detonating Charge, *Anvil*	Cartridge Case	Gun Round
Cartridge	*Shell Case*, Propelling Charge	Cartridge Case	Gun Round

Machine Gun or Rifle Munitions:

Bullet	*Jacket*, Point, *Core*		Machine Gun or Rifle Round
Primer	*Cup*, Detonating Charge, *Anvil*	Cartridge Case	Machine Gun or Rifle Round
Cartridge	*Case*, Propelling Charge	Cartridge Case	Machine Gun or Rifle Round

Bombs:

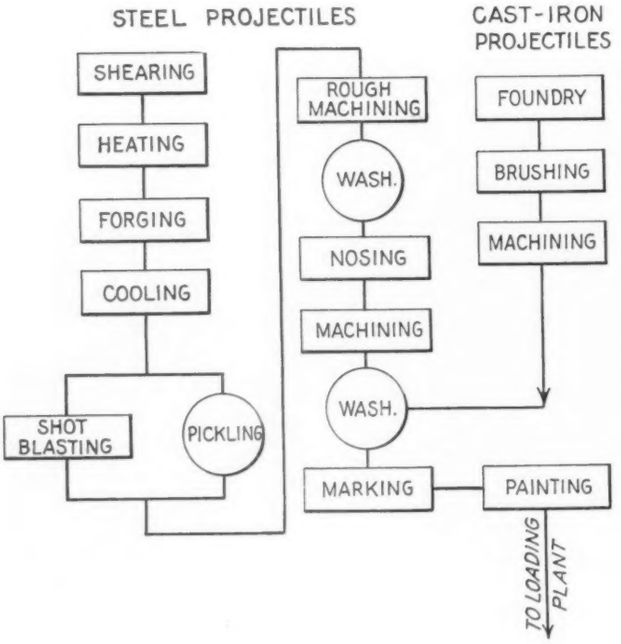
Bomb	*Bomb Body*, *Detonator*, Exploding Charge

Hand or Rifle Grenades:

Grenades	*Grenade Body*, Exploding Charge, *Fuse*, Handle or Shaft

Anti-Tank or Land Mines:

Mines	*Mine Case*, *Detonator*, Exploding Charge



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CLASS A: Flow sheet for shell, bomb and grenade body production. Shell bodies are made of steel, and bomb and grenade bodies are made of cast iron.

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Cleaning Technique

THE author describes in this report in two parts the cleaning equipment and technique used by munitions manufacturers in Europe before and shortly after the outbreak of the current war. The information contained herein was obtained while the author was acting as managing director of the European plant of the Magnus Chemical Co.

the manufacture of the explosives; and (6) the loading, where all elements are collected, assembled, and loaded.

Navy munitions plants, because of the material differences in the functions and objectives of the projectiles involved, have relatively little in common with army munitions, although there are, of course, many points of similarity.

Munitions Manufacture

The following flow sheets show the various phases of munitions manufacture, classified in accordance with the three major divisions: Classes A, B and C. There are a vast number of operations involved. For example, 165 steps, including 27 cleaning operations, or 16 per cent of the manufacturing operations, are necessary to make one 13 mm. (0.50 caliber) cartridge.

The trend today is that shell interiors are forge finished and bomb and grenade interiors are foundry finished. The nosing operation to form the ogival on steel shells is now generally a cold forming operation.

From the Class A flow sheet it will be noticed that a washing operation takes place at three points, namely:

(1) After forging and cooling (steel shells), a washing and pickling operation is necessary to remove forging scale. In some countries this wet process has been replaced by a dry shot blasting.

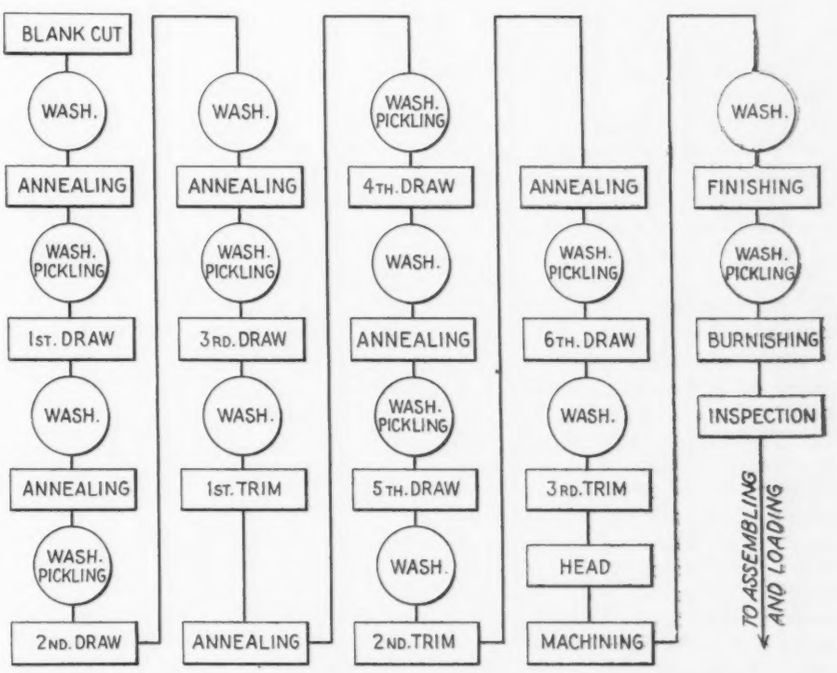
(2) After rough machining (steel shells), there is a washing and cleaning operation to get rid of lathe-cuttings before nosing. This operation is necessary in countries or plants where the cold-forming of the ogival is not practiced, that is, where nosing is done on heated shells.

(3) After final machining (steel shells, cast-iron bombs and grenades), a washing and careful degreasing operation removes all cutting oil, drawing grease, cuttings, etc.

This cleaning must be extremely thorough on the interior of the projectiles, since the final inspection after lacquering is of necessity strict and perfect adherence of the coat is demanded. The exterior must be equally as clean for allowing an adhesive paint coat.

Shell and cartridge cases are made of brass, cups and anvils of copper and copper alloys, and anti-tank mine cases of steel. Machine gun and most rifle bullets consist of a jacket of cupro-nickel alloy containing a core or a bullet made of lead or copper.

Flow sheet B applies for the most part to the manufacture of shell and cartridge cases and jackets of gun bullets. In anti-tank mine cases, annealing operations are not necessary as such cases do not have a large volume. This is one reason why they are made of steel. The manufacture of cups and anvils and bullet cores is rather



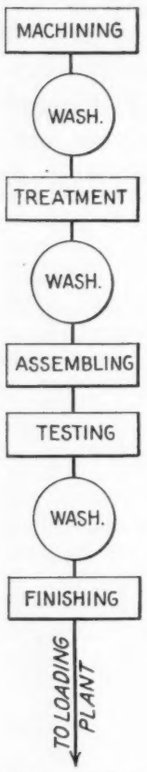
CLASS B: Flow sheet for the manufacture of shell and cartridge cases, machine gun and rifle bullet jackets, cups and anvils for primers, and anti-tank and land mine cases.

simple, necessitating only a final washing.

From the Class B flow chart, it will be noticed that the washing operations consist of three types:

(1) A washing and pickling operation, after annealing, to remove all traces of oxidation on the parts before the next drawing.

(2) A washing and degreasing operation after drawing, to remove all drawing grease on the parts before annealing.



CLASS C: Flow sheet for the manufacture of fuse parts, detonators and bullet cores.

(3) A final washing cleaning after machining, to remove all oil, metal particles, etc., on the surface of the parts in order to provide for good adherence of the lacquer with which the cases are coated, inside and out. Inspection standards are as uncompromisingly rigid on interiors, as they are in shells.

In some countries the final washing of cartridges and shell cases is followed by or combined with a burnishing or polishing operation.

To avoid the washing-degreasing operation, new drawing compounds have been developed in this country capable of burning off completely during annealing with no effect on the brass, either in staining or surface roughening. However, such compounds have not so far been adopted on a large scale abroad.

Fuse and detonator parts are made of different metals, such as brass, copper, steel, aluminum, and tin. These parts must be thoroughly cleaned to insure perfect functioning since they are intricate pieces of mechanism. The cleaning must be as thorough and the rinsing as complete, if not more so, than in the case of shells, since even a minute dirt particle may make a fuse inoperative or inaccurate. Furthermore, surfaces must be suitable for lacquering in most cases.

Bullet cores are made of lead alloy, copper, or common or hardened tungsten chromium steel. From the Class C flow chart, it can be observed that two washing operations are included in the manufacture of fuse parts, detonators, and bullet cores. These operations are:

(1) Individual cleaning and degreasing of all parts after machining to remove all traces of cutting-oil and the most minute particles of cuttings, etc.

(2) General washing after assembly of fuse or detonator parts, and after machining or hardening of bullet cores.

Cleaning Compounds

Now comes the most important phase of this study, that is, the type of machine and cleaning material used for cleaning each of the above classes of parts.

During peace time, in Europe, the tendency was to use alkaline cleaner compounds in hot solutions for heavy items such as shells, bombs, grenades, and all kinds of projectile cases; and solvents such as trichlorethylene or perchlorethylene for small shells (up to 25 mm.), jackets, bullet cores, and fuse parts. However, this tendency was merely relative, as in one instance the writer was requested by a European government—and against all logic—to design a large, continuous trichlorethylene degreaser for 75 mm. shells, whereas another arsenal was using caustic soda in a still tank for fuse parts.

However, when war started only one of these methods was really available because in a few months only alkaline cleaning compounds were obtainable. The fabrication of toxic gases and other important requirements absorbed most of the trichlorethylene and perchlorethylene.

Consequently, in the present study we deliberately omit that which concerns cleaning processes using such solvents, and deal only with washing machines using hot solutions of alkaline compounds which are most commonly used during war time in Europe.

The following data apply to all kinds of washing machines and processes for munitions cleaning:

(a) Although sometimes neglected, a final rinse is necessary and even indispensabe if the cleaning material contains caustics. In instances where shells are loaded with picric acid, caustic cleaning material should be prohibited. A double or triple rinse is often demanded by European war department specifications.

(b) Cleaning material and devices must not only remove greases but must also dislodge all dirts and metal particles.

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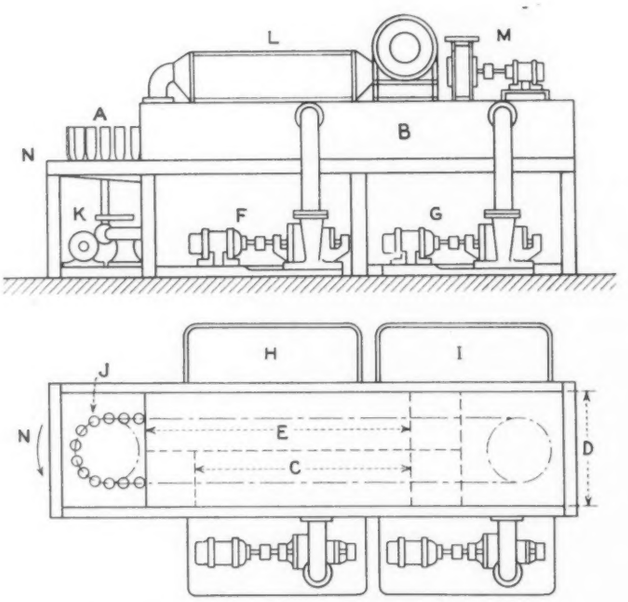

A	Shells	H	Washing solution filter
B	Tunnel	I	Rinsing solution filter
C	Washing section	J	Conveyor
D	Rinsing section	K	Conveyor driving device
E	Drying cooling section	L	Drying device
F	Washing pump	M	Vapor exhauster
G	Rinsing pump	N	Load-unload end

FIG. 1 — Illustrated here is the machine layout for washing shells, bombs and grenades up to 105 mm. in diameter.

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(c) The chief difficulty is to obtain a thorough contact of the cleaning solution with the interiors of the shells and shell cases. Corresponding thoroughness in rinsing is also essential.

(d) The parts must come out of the machine dry and cool.

Cleaning Class A Parts

Different types of washing machines are used depending upon the weight and size of the projectiles and ease in handling. For washing purposes, projectiles are classified in three categories: (1) up to 105 mm. diameter, including: 20, 25, 37, 50, 75, 80, 90, and 105 mm., (2) from 105 to 155 mm., and (3) greater than 155 mm.

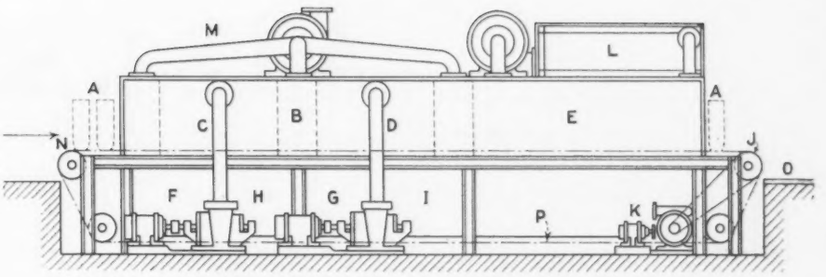
Each group encompasses operations to which a definite type of machine is used.

The washing machine shown in Fig. 1, for shell bomb, and grenade bodies up to 105 mm., is operated by one man who stands at the open end. Each time a washed shell or a group of washed shells pass before him, the man takes them off the conveyor of the machine and replaces them by a similar unclean shell or group of unclean shells. Shells from 50 to 105 mm. diameter are handled individually. Shells from 20 to 37 mm. are racked in baskets and handled in groups. Standard units have an hourly output of 300 to 15,000 shells, depending on the size of shells.

When placed on the conveyor, the shells travel inside the tunnel of the machine and pass successively into the cleaning, rinsing, drying and cooling chambers, and then they return to the point where they were loaded. The shells are placed bottom up and held in a vertical position by special fittings or links in such a manner that their entire inside and outside surfaces are thoroughly reached by the solution.

The hot washing and rinsing solutions are continuously heated, pumped, sprayed on shells, filtered and repumped. Warmed air is blown up on the shells on their return travel. Solutions are heated by steam, gas, oil, or electricity.

Owing to the dimensions and weight of shells and bombs from 105 to 155 mm. in diameter and the necessity for obtaining a reasonable output per unit, the tendency has been to build machines of the continuous, vertical conveyor type, as shown in Fig. 2. Such machines are operated by four men, two at each of the loading and unloading ends. As opposed to the type used for small shells, these machines are loaded at one end and unloaded at the other, and the endless conveyor, vertically driven, returns empty under the machine. Standard units clean 300 shells an hr.



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G	Rinsing pump	O	Unloading end
H	Washing solution filter	P	Return of conveyor

FIG. 2—This machine layout is for washing shells and bombs from 105 to 155 mm. in diameter.

BELOW

FIG. 3—Here is the machine design for washing shells and bombs more than 155 mm. in diameter.

The cleaning process is the same as for small shell bodies, but a peculiarity of the machine is in locating the conveyor at floor level of the shop.

Automatic washing machines for shells more than 155 mm. in diameter were proposed on the turntable principle, but there has been no widespread adoption of such devices. Such a machine is shown in Fig. 3, and consists of a turn-

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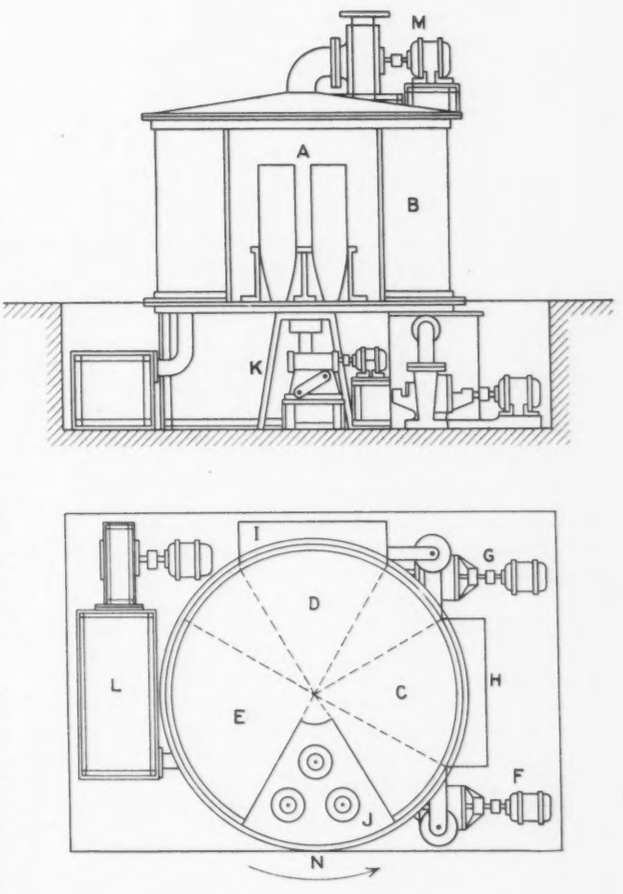

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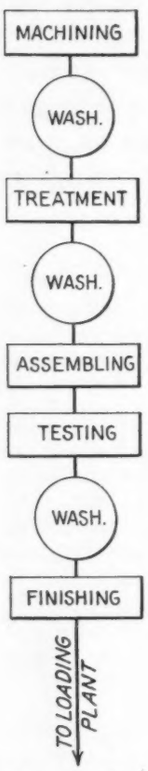

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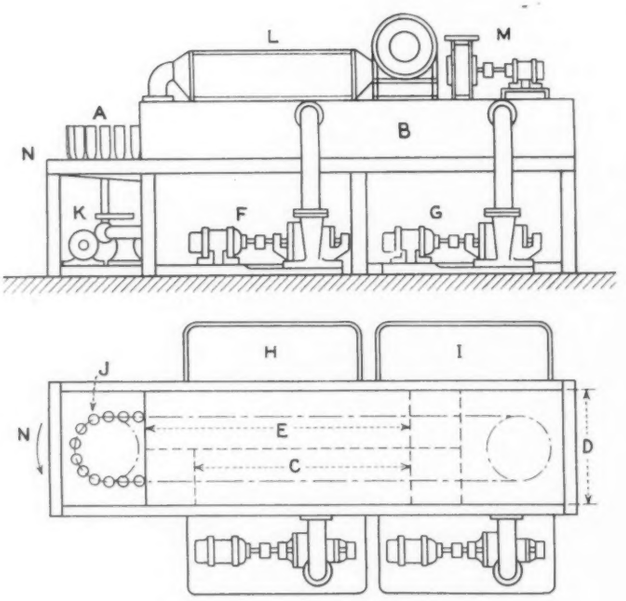

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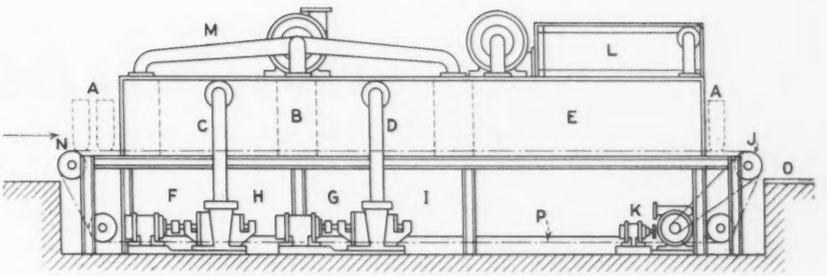

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BELOW

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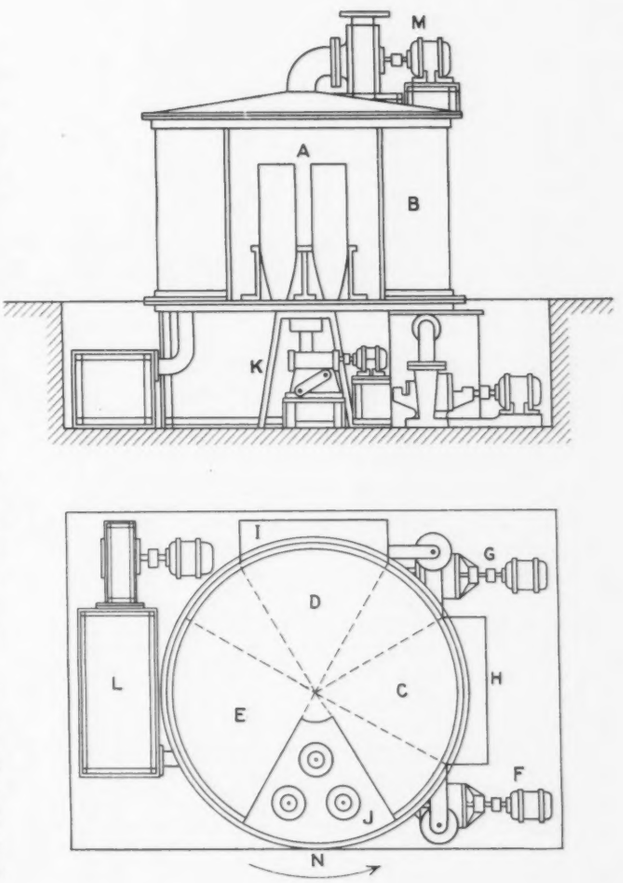

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A.I.S.I. Standard Steels

Standard Basic Open Hearth and Acid Bessemer Carbon Steels for Bars

Designation	Chemical Composition Limits, per cent			
	C	Mn	P Max.	S Max.
C 1006	0.08 max.	0.25/0.40	0.04	0.05
C 1008	0.10 max.	0.30/0.50	0.04	0.05
CB 1008	0.10 max.	. ....	....	...
C 1010	0.08/0.13	0.30/0.50	0.04	0.05
C 1012	0.10/0.15	0.30/0.50	0.04	0.05
CB 1012	0.15 max.	.....	...	...
C 1014	0.13/0.18	0.30/0.50	0.04	0.05
C 1015	0.13/0.18	0.40/0.60	0.04	0.05
C 1016	0.13/0.18	0.60/0.90	0.04	0.05
CB 1017	0.10/0.25	.....	. .	....
C 1017	0.15/0.20	0.40/0.60	0.04	0.05
C 1018	0.15/0.20	0.60/0.80	0.04	0.05
C 1019	0.15/0.20	0.70/1.00	0.04	0.05
C 1020	0.18/0.23	0.30/0.50	0.04	0.05
C 1021	0.18/0.23	0.40/0.60	0.04	0.05
C 1022	0.18/0.23	0.70/1.00	0.04	0.05
C 1023	0.20/0.25	0.30/0.50	0.04	0.05
C 1025	0.22/0.28	0.30/0.50	0.04	0.05
C 1026	0.22/0.28	0.40/0.60	0.04	0.05
C 1029	0.25/0.31	0.60/0.90	0.04	0.05
C 1030	0.28/0.34	0.60/0.90	0.04	0.05
CB 1032	0.25/0.40	.....	.	...
C 1033	0.30/0.36	0.60/0.90	0.04	0.05
C 1035	0.32/0.38	0.60/0.90	0.04	0.05
C 1038	0.35/0.42	0.60/0.90	0.04	0.05
C 1040	0.37/0.44	0.60/0.90	0.04	0.05
C 1042	0.40/0.47	0.60/0.90	0.04	0.05
C 1043	0.40/0.47	0.70/1.00	0.04	0.05
C 1045	0.43/0.50	0.60/0.90	0.04	0.05
C 1046	0.43/0.50	0.70/1.00	0.04	0.05
C 1050	0.45/0.55	0.60/0.90	0.04	0.05
C 1055	0.50/0.60	0.60/0.90	0.04	0.05
C 1059	0.55/0.65	0.50/0.70	0.04	0.05
C 1061	0.54/0.65	0.75/1.05	0.04	0.05
C 1064	0.60/0.70	0.50/0.70	0.04	0.05
C 1068	0.65/0.75	0.50 max.	0.04	0.05
C 1073	0.68/0.78	0.50/0.70	0.04	0.05
C 1074	0.70/0.80	0.50/0.70	0.04	0.05
C 1078	0.70/0.85	0.30/0.50	0.04	0.05
C 1080	0.70/0.85	0.60/0.90	0.04	0.05
C 1083	0.80/0.95	0.30/0.50	0.04	0.05
C 1085	0.80/0.95	0.60/0.90	0.04	0.05
C 1095	0.90/1.05	0.30/0.50	0.04	0.05
B 1008	0.10 max.	0.30/0.50	0.11	0.06
B 1011	0.13 max.	0.50/0.70	0.11	0.06

NOTE 1: When silicon is specified in standard basic open-hearth steels, silicon may be ordered only as 0.07 per cent maximum; 0.07 to 0.15 per cent; 0.10 to 0.20 per cent; or 0.15 to 0.30 per cent. In the case of many grades of basic open-hearth steel, special practice is necessary in order to comply with a specification including silicon.

NOTE 2: Acid bessemer steel is not furnished with specified silicon content.

THE ever-growing variety of chemical compositions and quality requirements of steel specifications has been a matter of concern in the steel industry for years. That condition prompted the general technical committee of the American Iron and Steel Institute to make a study of it with a view to simplifying the problems of both consumer and producer. Having in mind the potential benefits of simplification and standardization, their survey was first directed toward determining which of the many grades being currently specified were the ones in most common demand; also the feasibility of combining specifications having like requirements.

That survey showed that, exclusive of stainless steels and tool steels, steels with several thousand different combinations of chemical elements were being manufactured to meet the individual demands of purchasers of the primary rolled and forged steel products used in American industry.

The facts thus developed have convinced steel producers that if their efforts could be concentrated upon a limited number of standardized grades, deliveries could be expedited and service improved. Moreover, there would be better opportunity to achieve advances in manufacturing practices and quality and to study more fully the possibilities of application inherent in those grades.

The general technical committee selected the chemical compositions and physical test properties listed on these pages (and one following) as representing grades of proven merit and in extensive use for a wide variety of purposes. Such steels are called *Standard Steels*.

When the many other chemical compositions of carbon steel bars now being used are critically compared with the equivalent standard grades listed in the tables, it is believed that in most cases the standard grades can successfully be used to replace them without detriment to fabricating methods or impairment of quality of the article manufactured.

On the other hand, it is recognized that compositions or physical test specifications other than those listed in the tables of standard steels will at times be needed for specialized purposes. Provision has been made by the committee by setting up standard ranges for and limits for non-standard steels.

System of Identification

A new system of symbols has also been devised to identify grade classifications of these standard steels. Capital letter prefixes are used to indicate types of steel by process of manufacture, as follows:

A—Basic open-earth alloy steel
B—Acid bessemer carbon steel

ls to Speed Defense . . .

C—Basic open-earth carbon steel
CB—Either acid bessemer or basic open hearth
D—Acid open-earth carbon steel
E—Electric furnace steel.

Numbers are used to indicate grades of steel by chemical composition. The series is essentially like the system originally used by the Society of Automotive Engineers, but is extended to include other grades of steel. The last two digits of the four numeral series are intended as far as feasible to indicate the approximate middle of the carbon range; for example, 21 represents a range of 0.18 to 0.23 per cent carbon. It is necessary, however, to deviate from this rule and to interpolate numbers in the case of some carbon ranges, and for variations in manganese, sulphur, phosphorus and chromium with the same carbon ranges. Where the carbon content is over 1.00 per cent, five digits must be used. The series numerical designations are as follows:

Series Designation	Types and Classes
10xx	Basic open-hearth and acid bessemer carbon steel grades, nonsulphurized and nonphosphorized
11xx	Basic open-hearth and acid bessemer carbon steel grades, sulphurized but not phosphorized
12xx	Basic open-hearth carbon steel grades, phosphorized
13xx	Manganese 1.60 to 1.90 per cent
23xx	Nickel 3.50 per cent
25xx	Nickel 5.00 per cent
30xx	Nickel 0.50 per cent—Chromium 0.50 per cent
31xx	Nickel 1.25 per cent—Chromium 0.60 per cent
32xx	Nickel 1.75 per cent—Chromium 1.00 per cent
33xx	Nickel 3.50 per cent—Chromium 1.50 per cent
40xx	Molybdenum
41xx	Chromium-molybdenum
43xx	Nickel-chromium-molybdenum
46xx	Nickel 1.65 per cent—Molybdenum 0.25 per cent
48xx	Nickel 3.25 per cent—Molybdenum 0.25 per cent
50xx	Low chromium
51xx	Medium chromium
52xxx	Chromium, high-carbon
61xx	Chromium-vanadium
92xx	Silicon-manganese

Complete data on these standard steels are given in two "Steel Products Manuals," published by the American Iron and Steel Institute, 350 Fifth Avenue, New York. Section 8, revised July, 1941, covers hot rolled carbon steel bars; Section 10, dated May, 1941, covers basic open hearth alloy steels and electric furnace steels.

The table of chemical compositions for alloy and electric furnace steels will be found on the following page.

. . . Simplification and standardization of chemical compositions and quality requirements of great service to both producer and consumer.

Standard Basic Open Hearth Sulphurized Carbon Steels for Bars

Designation	Chemical Composition Limits, per cent			
	C	Mn	P Max.	S
C 1109	0.08/0.13	0.60/0.90	0.045	0.08/0.13
C 1110	0.08/0.13	0.60/0.90	0.045	0.10/0.15
C 1112	0.10/0.16	1.00/1.30	0.045	0.08/0.13
C 1113	0.10/0.16	1.00/1.30	0.045	0.23/0.32
C 1115	0.13/0.18	0.70/1.00	0.045	0.08/0.13
C 1116	0.13/0.18	0.70/1.00	0.045	0.10/0.15
C 1117	0.14/0.20	1.00/1.30	0.045	0.08/0.13
C 1118	0.14/0.20	1.30/1.60	0.045	0.08/0.13
C 1120	0.18/0.23	0.60/0.90	0.045	0.08/0.13
C 1121	0.18/0.23	0.70/1.00	0.045	0.08/0.13
C 1122	0.17/0.23	1.35/1.65	0.045	0.08/0.13
C 1132	0.27/0.34	1.35/1.65	0.045	0.08/0.13
C 1137	0.32/0.39	1.35/1.65	0.045	0.08/0.13
C 1140	0.37/0.44	0.60/0.90	0.045	0.04/0.07
C 1145	0.42/0.49	0.70/1.00	0.045	0.04/0.07

NOTE 1. The standard steels C 1140 and C 1145 listed in Table II may be ordered with a silicon content of 0.07 per cent maximum; 0.07 to 0.15 per cent; 0.10 to 0.20 per cent; or 0.15 to 0.30 per cent. Special practice is necessary to comply with a specification of a minimum silicon content in a sulphurized steel when the maximum limit of sulphur is over 0.055 per cent.

NOTE 2. Sulphurized steel is not subject to check analysis for sulphur

Standard Acid Bessemer Sulphurized Carbon Steels for Bars

Designation	Chemical Composition Limits, per cent			
	C	Mn	P	S
B 1110	0.13 max.	0.60 max.	0.11 max.	0.045/0.075
B 1111	0.08/0.13	0.60/0.90	0.09/0.13	0.10/0.15
B 1112	0.08/0.13	0.60/0.90	0.09/0.13	0.16/0.23
B 1113	0.08/0.13	0.60/0.90	0.09/0.13	0.23/0.32

NOTE 1: Sulphurized steel is not subject to check analysis for sulphur.
NOTE 2: Acid bessemer steel is not furnished with specified silicon content.

Standard Basic Open Hearth Alloy and Electric Furnace Carbon and Alloy Steels

Designation	Chemical Composition Limits, Per Cent								
	C	Mn	P Max.	S Max.	Si	Ni	Cr	Mo	V
A 4608	0.06/0.11	0.40 max.	0.040	0.040	0.20 max.	1.40/1.75	—	0.15/0.25	—
A 4615	0.13/0.18	0.45/0.65	0.040	0.040	0.15/0.30	1.65/2.00	—	0.20/0.30	—
E 4617	0.15/0.20	0.45/0.65	0.025	0.025	0.20/0.35	1.65/2.00	—	0.20/0.27	—
A 4620	0.17/0.22	0.45/0.65	0.040	0.040	0.15/0.30	1.65/2.00	—	0.20/0.30	—
E 4620	0.17/0.22	0.45/0.60	0.025	0.025	0.20/0.35	1.65/2.00	—	0.20/0.27	—
A 4621	0.18/0.23	0.70/0.90	0.040	0.040	0.15/0.30	1.65/2.00	—	0.20/0.30	—
E 4640	0.38/0.43	0.60/0.80	0.025	0.025	0.15/0.30	1.65/2.00	—	0.20/0.27	—
A 4815	0.13/0.18	0.40/0.60	0.040	0.040	0.15/0.30	3.25/3.75	—	0.20/0.30	—
A 4821	0.18/0.23	0.50/0.70	0.040	0.040	0.15/0.30	3.25/3.75	—	0.20/0.30	—
A 5045	0.43/0.48	0.70/0.90	0.040	0.040	0.15/0.30	—	0.55/0.75	—	—
A 5120	0.17/0.22	0.70/0.90	0.040	0.040	0.15/0.30	—	0.70/0.90	—	—
A 5130	0.28/0.33	0.70/0.90	0.040	0.040	0.15/0.30	—	0.80/1.10	—	—
A 5145	0.43/0.48	0.70/0.90	0.040	0.040	0.15/0.30	—	0.70/0.90	—	—
A 5150	0.45/0.55	0.70/0.90	0.040	0.040	0.15/0.30	—	0.90/1.20	—	—
A 5152	0.47/0.55	0.70/0.90	0.040	0.040	0.15/0.30	—	0.70/0.90	—	—
E 52095	0.90/1.00	*0.30/0.50	0.025	0.025	0.20/0.35	—	0.45/0.65	—	—
E 52098	0.90/1.05	*0.30/0.50	0.025	0.025	0.20/0.35	—	1.00/1.25	—	—
E 52099	0.90/1.05	*0.30/0.50	0.025	0.025	0.20/0.35	—	1.30/1.65	—	—
E 52100	0.95/1.10	*0.30/0.50	0.025	0.025	0.20/0.35	—	1.20/1.50	—	—
E 52101	0.95/1.10	*0.30/0.50	0.025	0.025	0.20/0.35	—	1.30/1.65	—	—
E 52107	1.00/1.15	*0.30/0.50	0.025	0.025	0.20/0.35	—	1.35/1.65	—	—
A 6120	0.17/0.22	0.70/0.90	0.040	0.040	0.15/0.30	—	0.70/0.90	—	0.10 min.
E 6150	0.47/0.53	0.70/0.90	0.025	0.025	0.15/0.30	—	0.80/1.10	—	0.15 min.
A 6152	0.48/0.55	0.70/0.90	0.040	0.040	0.15/0.30	—	0.80/1.10	—	0.10 min.
A 9255	0.50/0.60	0.70/0.90	0.040	0.040	1.80/2.20	—	—	—	—
A 9260	0.55/0.65	0.70/0.90	0.040	0.040	1.80/2.20	—	—	—	—
A 9262	0.55/0.65	0.70/0.90	0.040	0.040	1.80/2.20	—	0.20/0.30	—	—
A 9263	0.55/0.65	0.70/0.90	0.040	0.040	1.80/2.20	—	0.30/0.40	—	—

* These steels may be specified to either 0.30 to 0.45 per cent or 0.35 to 0.50 per cent manganese, but it is recommended that the full range be allowed wherever possible.

NOTE 1: The lowest standard maximum phosphorus or sulphur content for acid open hearth or acid electric furnace alloy steel is 0.05 per cent each.

NOTE 2: The lowest standard minimum silicon content for acid open hearth or acid electric furnace alloy steel is 0.15 per cent.

NOTE 3: For steels ordered to the above ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table IV.

NOTE 4: The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7,000 lb. irrespective of size.

Designation	Chemical Composition Limits, Per Cent							
	C	Mn	P Max.	S Max.	Si	Ni	Cr	Mo
A 1320	0.17/0.22	1.80/2.10	0.040	0.040	0.20/0.35	—	—	—
A 1321	0.18/0.23	1.60/1.90	0.040	0.040	0.15/0.30	—	—	—
A 1330	0.28/0.33	1.60/1.90	0.040	0.040	0.15/0.30	—	—	—
A 1335	0.33/0.38	1.60/1.90	0.040	0.040	0.15/0.30	—	—	—
A 1340	0.38/0.43	1.60/1.90	0.040	0.040	0.15/0.30	—	—	—
A 2317	0.15/0.20	0.40/0.60	0.040	0.040	0.15/0.30	3.25/3.75	—	—
A 2330	0.28/0.33	0.60/0.80	0.040	0.040	0.15/0.30	3.25/3.75	—	—
A 2335	0.33/0.38	0.60/0.80	0.040	0.040	0.15/0.30	3.25/3.75	—	—
A 2340	0.38/0.43	0.70/0.90	0.040	0.040	0.15/0.30	3.25/3.75	—	—
E 2512	0.09/0.14	0.45/0.60	0.025	0.025	0.15/0.30	4.75/5.25	—	—
A 2514	0.12/0.17	0.40/0.60	0.040	0.040	0.15/0.30	4.75/5.25	—	—
E 2517	0.15/0.20	0.45/0.60	0.025	0.025	0.15/0.30	4.75/5.25	—	—
A 3045	0.43/0.48	0.75/0.95	0.040	0.040	0.15/0.30	0.60/0.80	0.60/0.80	—
A 3115	0.13/0.18	0.40/0.60	0.040	0.040	0.15/0.30	1.10/1.40	0.55/0.75	—
A 3120	0.17/0.22	0.60/0.80	0.040	0.040	0.15/0.30	1.10/1.40	0.55/0.75	—
A 3130	0.28/0.33	0.60/0.80	0.040	0.040	0.15/0.30	1.10/1.40	0.55/0.75	—
A 3135	0.33/0.38	0.60/0.80	0.040	0.040	0.15/0.30	1.10/1.40	0.55/0.75	—
A 3140	0.38/0.43	0.70/0.90	0.040	0.040	0.15/0.30	1.10/1.40	0.55/0.75	—
A 3141	0.38/0.43	0.70/0.90	0.040	0.040	0.15/0.30	1.10/1.40	0.70/0.90	—
A 3145	0.43/0.48	0.70/0.90	0.040	0.040	0.15/0.30	1.10/1.40	0.70/0.90	—
A 3150	0.48/0.53	0.70/0.90	0.040	0.040	0.15/0.30	1.10/1.40	0.70/0.90	—
A 3240	0.38/0.45	0.40/0.60	0.040	0.040	0.15/0.30	1.65/2.00	0.90/1.20	—
E 3310	0.08/0.13	0.45/0.60	0.025	0.025	0.15/0.30	3.25/3.75	1.40/1.75	—
E 3316	0.14/0.19	0.45/0.60	0.025	0.025	0.15/0.30	3.25/3.75	1.40/1.75	—
A 4023	0.20/0.25	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4024	0.20/0.25	0.70/0.90	0.040	0.035/0.050	0.20/0.35	—	—	0.20/0.30
A 4027	0.25/0.30	0.70/0.90	0.040	0.035/0.050	0.20/0.35	—	—	0.20/0.30
A 4032	0.30/0.35	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4037	0.35/0.40	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4042	0.40/0.45	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4047	0.45/0.50	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4063	0.60/0.67	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4065	0.62/0.70	0.70/0.90	0.040	0.040	0.20/0.35	—	—	0.20/0.30
A 4119	0.17/0.22	0.70/0.90	0.040	0.040	0.15/0.30	—	0.45/0.65	0.20/0.30
A 4120	0.17/0.22	0.70/0.90	0.040	0.040	0.15/0.30	—	0.60/0.80	0.20/0.30
A 4130	0.28/0.33	0.40/0.60	0.040	0.040	0.15/0.30	—	0.80/1.10	0.15/0.25
E 4132	0.30/0.35	0.40/0.60	0.025	0.025	0.15/0.30	—	0.80/1.10	0.18/0.25
A 4134	0.32/0.37	0.40/0.60	0.040	0.040	0.15/0.30	—	0.80/1.10	0.15/0.25
E 4135	0.33/0.38	0.70/0.90	0.025	0.025	0.15/0.30	—	0.80/1.10	0.18/0.25
E 4137	0.35/0.40	0.70/0.90	0.025	0.025	0.15/0.30	—	0.80/1.10	0.18/0.25
A 4142	0.40/0.45	0.75/1.00	0.040	0.040	0.15/0.30	—	0.80/1.10	0.15/0.25
A 4143	0.40/0.45	0.75/1.00	0.040	0.040	0.15/0.30	—	0.80/1.10	0.30/0.40
E 4150	0.48/0.53	0.70/0.90	0.025	0.025	0.15/0.30	—	0.80/1.10	0.20/0.27
A 4317	0.15/0.20	0.45/0.65	0.040	0.040	0.15/0.30	1.65/2.00	0.40/0.60	0.20/0.30
A 4320	0.17/0.22	0.45/0.65	0.040	0.040	0.15/0.30	1.65/2.00	0.40/0.60	0.20/0.30
A 4337	0.35/0.40	0.60/0.80	0.040	0.040	0.15/0.30	1.65/2.00	0.60/0.80	0.30/0.40
E 4337	0.35/0.40	0.60/0.80	0.025	0.025	0.15/0.30	1.65/2.00	0.70/0.90	0.23/0.30
E 4340	0.40/0.45	0.60/0.80	0.025	0.025	0.15/0.30	1.65/2.00	0.70/0.90	0.23/0.30

New Equipment . . .

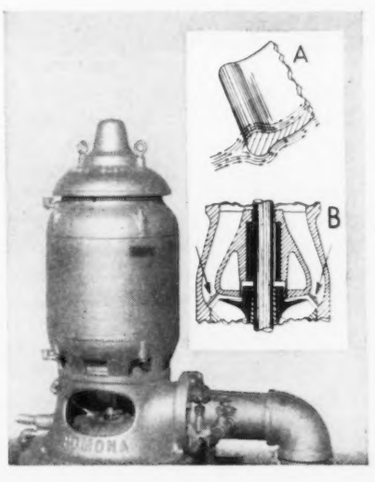
Here are some new developments in the sphere of factory service equipment, such as pumps, valves, vibration insulators, lubricating systems, paging systems, and pipe fittings and couplings. Also described are such items as safety goggles, masks, and gloves that enhance safe working conditions in plants and shops.

A NEW line of horizontal triplex high-pressure pumps, designed to handle comparatively large volumes of water in conjunction with hydraulic press installations, has recently been announced by *Baldwin Southwark division of the Baldwin Locomotive Works*, Philadelphia. The pumps are arranged to provide a 60 deg. overlap in discharge impulses, tending to smooth out pump pulsations. The 12-in. stroke pump discharge ranges from 23 gal. per min. at 7500 lb. per sq. in. to 160 gal. per min. at 1000 lb. Other capacities and pressures are available, depending on the size of plunger size used.

The pump frame is a one-piece semi-steel casting and the gear case, containing double helical single reduction gears, is cast integrally with the frame. All rotating elements are carried in roller bearings except the crank ends of the connecting rods which use steel-backed babbitt lined bearings. Valves are of Cramp super-strength bronze and seats are stainless steel. The cylinder block is a one-piece steel forging, and ground and polished plungers are freely held in their crossheads to permit self-alinement with respect to the bronze bushings in the cylinder block. The pumps are built in 12, 15, and 18-in. stroke lengths, and are designed for pressures in excess of 1000 lb. per sq. in. They are designed for direct coupling to 125, 250, and 500-hp. motors.

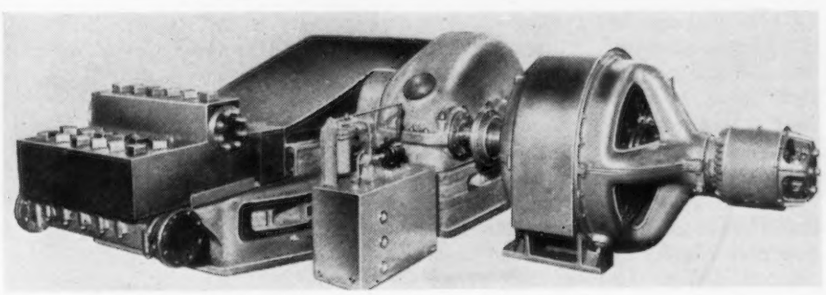
Improved Vertical Turbine Pump

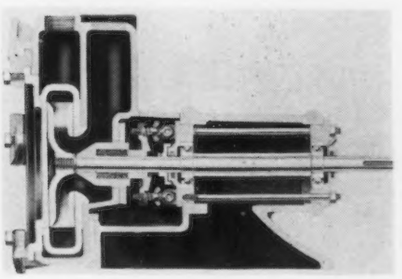
IMPROVEMENTS to their vertical turbine pumps involving design changes in the guide vanes, which alters from horizontal to vertical the flow direction of fluids being pumped, were announced by the *Pomona Pump Co.*, St. Louis. By forming the advanced guide vane ends of a bulbous shape, the direction of the fluid flow is substantially tangential to the vane surface and greater uniformity of flow pattern is acquired, friction is reduced, and efficiency of fluid lift is increased. The recessive curve at the rear of the bulb-shaped vane eliminates development of eddy currents as was the case with the knife edge guide vane. These new guide vanes are an inherent part of the pump bowl assembly, and it is only necessary to substitute a new bowl assembly to old vertical turbine pumps to take advantage of the new design.



Horizontal Shaft Pumps

FOLLOWING the introduction of vertical shaft pumps, the *American Manganese Steel division* of the *American Brake Shoe & Foundry Co.*, Chicago Heights, Ill., now manufactures Amsco-Nagle horizontal shaft pumps. These new horizontal pumps, types A and T, are available in all sizes from ¼ in. to 6 in., in capacities up to 1400 gal. per min., and for operating heads up to 100 ft. The new pumps feature clamp-bolt construction of the water end, a bearing arrangement that as-





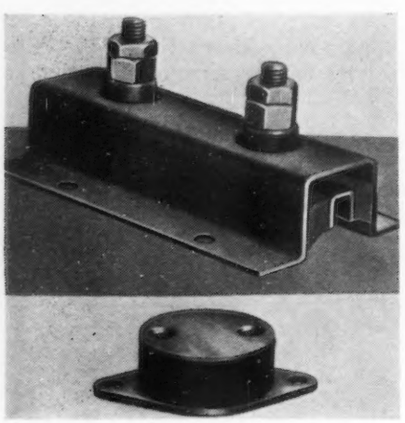
sures proper alinement, sealed bearings, a readily accessible stuffing box and self-priming features. Four types of impellers are available, two, four, and six-vane shrouded type, and four-vane open type. These pumps are recommended for handling sludge, slime and slurries.

Improved Pressure Reducing Valve

NORTHERN EQUIPMENT CO., Erie, Pa., announces an improved design of its Copes Type R-DSLH pressure reducing valve, a relay-operated unit used for remote control from a master controller. The changes have been in the mounting of the diaphragm operator receiving pressure impulses from the master controller and in the linkage by which the diaphragm movement is transmitted to the relay-operator of the valve. These parts have been strengthened and arranged more compactly to assure more rugged and accurate installation. The valve is made in sizes from 1 to 14 in. and in all pressure standards from 125 to 1500 lb.

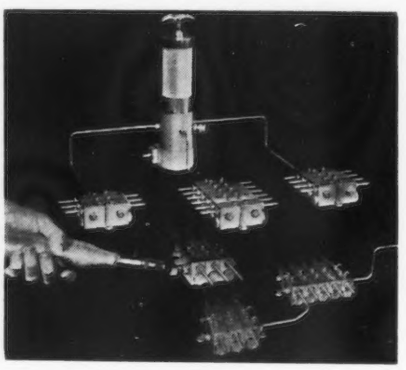
Vibration Controls

SEVERAL new types of vibration isolators employing rubber as a cushioning medium have been announced by the *Korfund Co., Inc.*, Long Island City, N. Y., to meet an increased demand for isolation of vibration and noise in the lower loading ranges. Although not quite as durable as steel springs, they are as efficient when properly used and their economy will appeal to many users of relatively light-weight equipment. The mountings for shear loads come in capacities for single units ranging from 25 to 450 lb., and two or more can be combined in steel housings when greater load capacities are required. The compression type isolator is suitable for concentrated loads ranging up to 1200 lb. per mounting. Both top and bottom steel sections are securely bonded to the round rubber stock, and if desired, this unit may also be used as a shear-mounting by bolting the base plate in a vertical position.



Centralized Lubricating System

NON-REVERSING single pipe system of centralized lubrication has been brought out by *Trabon Engineering Corp.*, 1814 East 40th Street, Cleveland. This improved distributor consists of a bank of three or more sections, each of which discharges a measured quantity of lubricant alternately through one or two discharge outlets which are directly connected to bearings. As capacity of the different sections may vary considerably, a single distributor can deliver just the desired amount of lubricant to the various bearings. In addition to its simplicity of operation and effectiveness of action this system is economical both in operation and installation.



Check and Plug Valves

WHEATLEY BROTHERS, Tulsa, Okla., announce two improved valves to the trade, their check valve and plug valve. The check valve is made in sizes from 2 to 10 in. for pressures from 175 to 1000 lb., and has been used successfully against oil, water, natural gas and many acids. The feature of this valve is its synthetic rubber seat or ring which insures positive seal regardless of grit, sand, or foreign matter in the fluid being handled. The plug valve comes in 2, 3, and 4 in. sizes for pressures of 175, 500 and 800 lb. and has been used against water, gas, oil, and many acids. This valve has a Micarta disk or seal, which of course, can be changed to bronze or any other desirable type seal.

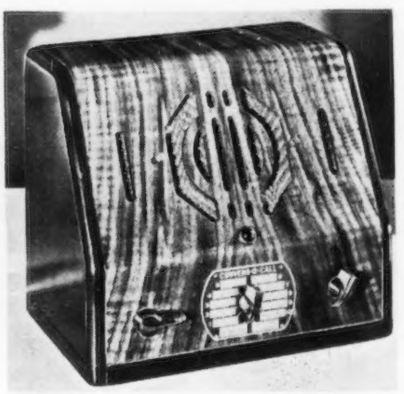
Industrial Paging System

DESIGNED especially for use in factories, offices, warehouses, and transportation terminals, this Knight industrial paging system, made by *Allied Radio Corp.*, 833 West Jackson Boulevard, Chicago,

operates from 110 volt, 60 cycle a.c. The amplifier will handle four or more 8-in. PM dynamic speakers with sufficient volume for simultaneous coverage of large areas. The system consists of amplifier with tubes and volume level meter, a microphone with a 25 ft. cable and switch, a desk-type microphone stand, and four speakers with transformers, each transformer installed in a steel projector baffle with wall mounting brackets. A special PBX telephone arm for mounting the microphone on a switchboard can also be purchased.

Two Way Call System

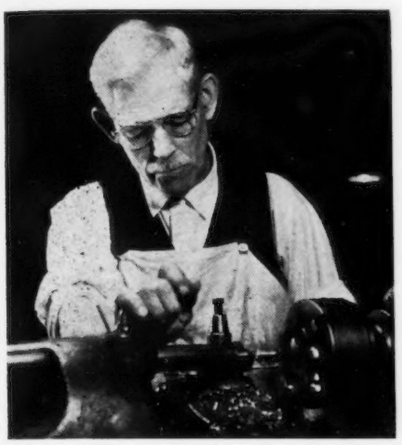
CONVERS-O-CALL is a new, low priced electric paging and inter-communicating system that will allow conversation between two to 10 people at one time, and is made by the *National Inter-Communicating Systems*, 2434 Montrose Avenue, Chicago. Calls can originate at either end of the system, forming a two way voice link at any distance up to three miles. The sys-



tem uses less current than a 40 watt bulb, and operates on 110-125 volt a.c. or d.c., from a single electrical outlet.

Corrective Safety Goggles

THE *American Optical Co.*, Southbridge, Mass., makes seven different styles of safety goggles fitted with Super Armorplate lenses



that can be ground to prescription, affording both eye correction and eye protection for industrial workers with defective vision. These special protective-corrective safety goggles include spectacle and side-shield types for different kinds of hazards, and lenses can be obtained in clear white or Calobar and Crookes glare protection glass.

Eye Shield

IMPROVED eye shield for use on gas welding, cutting and blow torch operations is produced by *Jackson Products*, Detroit. This type BX is a cover-all shield and prescription glasses can be worn underneath. The light opaque frame fits snugly to forehead and cheeks, barring light and sparks. The shield takes a standard 2x4⅛ in. lens, secured in the retaining frame by an improved spring. Connection between shield and headgear provide better adjustment of lens angle. The entire lens assembly can easily be pushed out of the way when not needed.

Expansion Anchoring Bolts

THE Brush nail expansion bolt, similar to a rivet with a hole drilled through its length and its barrel slotted toward the head, is made by the *Brush Nail Expansion Bolt Co.*, Greenwich, Conn., who claims it will attach heavy machinery, chairs, railings, brackets, fixtures and other things to floors and walls, both wood and masonry in seconds instead of minutes. A nail is driven down through the bolt and wedges or expands the sides of the bolt against the sidewalls of the hole in the floor or wall, locking the bolt. The bolts can be removed and used again.

Welding Goggles

SPECIAL safety features are included in a new line of welding goggles just introduced by *Bausch & Lomb*, 30 Rockefeller Plaza, New York. The new goggles known as the Arc-Ban are of the louver side shield construction. The louvers are arranged for a clear air passage under exclusion of all light and

elimination of all projections which might cause abrasion or injury. Lightweight composition cups are designed to conform to facial contours. Models are offered to take care of workmen with corrective glasses.

Safety Goggles

ON-CENTER safety goggle of the spectacle type has been announced by the *American Optical Co.*, Southbridge, Mass. Features of this sturdy, comfortable goggle include a double-braced bridge for hard usage, comfortable rocking pads, insulated, heat-resisting, perspiration-proof temples, and the added protection of Super Armorplate clear or Calobar lenses. This goggle can be obtained with non-corrosive wire-mesh side shields. There are three eye and bridge sizes.

Protection Masks

ANNOUNCEMENT is made by *Mine Safety Appliances Co.*, Pittsburgh, of the new Dustfoe and Comfo eyeshield assemblies. These units furnish Bureau of Mines approved protection against even invisible particles of harmful dust, and guard the wearers' eyes from flying dust and grit by a light, durable, transparent and replaceable plastic shield. In the new combination the respirators retain their former advantages.

This company also produces a Coolband, a perspiration retainer which betters hot working conditions by preventing sweat from getting into the eyes or on goggles and glasses. It consists of a soft, flexible sponge band and it is worn around the head.

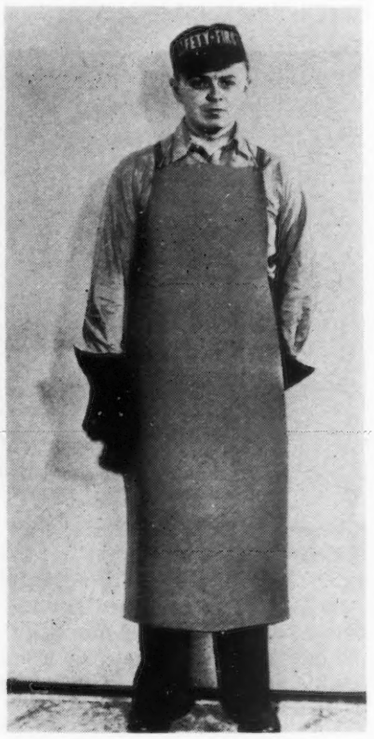
Smoke Mask

THIS new double sponge type smoke mask recently introduced by *H. S. Cover*, South Bend, Ind., has twin filter apertures, a Dupor plastic valve that exhausts

breathed air, and a slide fastener type head band for easier adjustment. It can be folded up to fit the pocket. The twin capacity of the new mask gives the wearer greater breathing comfort, and when the sponges are moistened, smoke is kept out of the lungs. The mask fits low on the face and does not interfere with goggles. It weighs less than 5 oz.

Protectocote Apron

A NEW protective apron, completely different from conventional oiled duck, rubberized cloth and synthetic types, is announced by *American Optical Co.*, South-



bridge, Mass. The material of this new AO Protectocote provides effective protection against oils, tar, acids, chemicals, paints, varnishes, cutting fluids, solvents, naphtha, caustics and alkalis. It will resist heat, is tough, light, durable, and is made in two styles and 11 sizes.

Vibration Insulators

THREE new Vibro-Insulators, devices of rubber and metal which decrease vibration and noise in machinery of many types, were recently announced by the *B. F. Goodrich Co.*, Akron, Ohio, and listed as types 14, 35 and 36. Type 14 is recommended for a load in vertical shear of 80 lb. per sq. in., deflection in shear of 1 in. at a loading of 80 lb. and a minimum disturbing frequency at this deflection of 470 per min. This type is also supplied with rubber in compression by placing the metals in horizontal position. In type 33 the rubber is applied only in compression with maximum loading 150 lb. and deflection at that point of 5/32 in., with minimum disturbing frequency of 1200 per min. Type 36 is best adapted for work with rubber in compression, although it can also be applied in shear. With 35 and 50 durometer hardness, loading beyond 0.175 in. is not recommended. Under this load, the minimum disturbing frequency is 1250 per min. and the load necessary to deflect the 35 durometer mounting is 100 lb., and the 50 durometer mounting load is 85 lb.

Fingerless Gloves

THIS fingerless glove meets the requirements of operators who must have freedom of the fingers to sort or pick up thin sheets or small parts, but affords protection for the palm of the hand and between the fingers. *Industrial Gloves Co.*, Danville, Ill., perfected this glove,

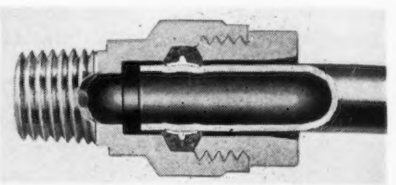
which is made of chrome tanned long wearing split leathers and is steel stitched. The glove is made in three sizes: small for women operators, and medium and large for men.

Protective Hand Cream

MITTS is a water soluble hand cream, made by *Mitts Mfg. Co.*, 367 East 45th Street, Brooklyn, that is applied to the skin before starting work. It dries quickly and acts as an invisible glove, guarding the hands from grease, paint, ink, and other matter difficult to remove. Mitts also protects the hands from irritating materials which cause industrial skin trouble. Mitts washes off easily with soap and water, removing all of the dirt with it.

High Pressure Tube Fittings

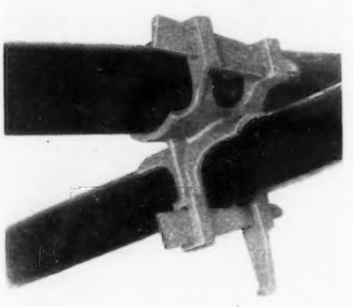
A NEW line of Sealflex flexible, high pressure tube fittings introduced by *Harris Products Co.*, Detroit, Mich., permit tube flexing at the connection of up to 10 deg. angles and are made in a wide range of standard sizes. The cutaway section in the illustration shows how the ferrule grips the tube to provide a slip-proof connection, yet one that permits wide angle flexing. The connection does not depend on the strength of the rubber grommet and eliminates the possibility of pressure swedging



down the end of the tube, causing failure of the connection. Restriction in the line when the ferrule is "rolled in" to handle high pressure work is only about 0.002 in. on the i.d. The insulator grommet is also made of synthetic materials.

Tubular Scaffold Couplings

QUICK Lock end connectors and couplings, made by the *Dravo Corp.*, Pittsburgh, eliminates prefabrication of tubular material in building tubular scaffolds. End connectors screw snugly on threaded pipe and lugs engage the recessed member, providing a rigid union. Couplings hold scaffolding members at proper angles for any part of the structure. Jaws are hinged so that couplings may readily be applied at any point in the

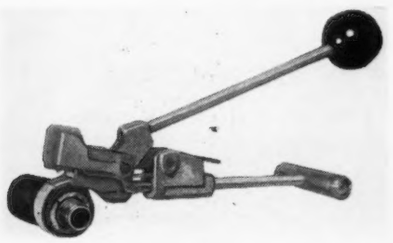


scaffolding or staging. The wedges in the couplings cannot become separated from the clamp at any time.

Locking Hose Joints

SIMPLIFIED connecting of various male and female fittings to hose of any kind is the purpose of a new tool, the Punch-Lok. A broad, flat, high tensile strength gal-

vanized steel band is wrapped around the joint twice and after tensioning it with a pull of 1000 lb. within the locking tool, the ends are securely fixed together without loss of tension within the flat pressed



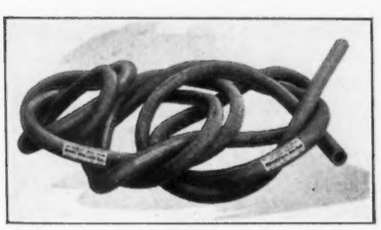
steel clip. The excess band cut-off is flush with the clip. This tool is produced by the *Punch-Lok Co.*, 430 North Wolcott Avenue, Chicago.

Stationary Diesel Engine

DESIGN of its heavy diesel engines has been improved by the *Chicago Pneumatic Tool Co.*, 6 East 44th Street, New York, in the new 16 CP line of motors. Horsepower ranges from 375 in the three-cylinder unit to 1000 in the eight-cylinder model. Greater fuel economy is claimed for these engines by virtue of improvements in the combustion chamber design and location of the inlet valve and the fuel injection system. The ample strength of every part insures long life and low maintenance with all wearing parts completely enclosed and automatically lubricated. The fuel system is simple and efficient; starting is easy.

Rubber Hose

INTRODUCTION of the latest development in hose construction has been announced by the *Manhattan Rubber Mfg. Division*, Passaic, N. J. The new Condor Momo-Flex hose is claimed to combine balance, homogeneity and flexibility and to apply a principle of construction which was first applied to conveyor belts. Thus this heavy-duty material which is light, has inseparable cover and plies, little elongation and expansion, is



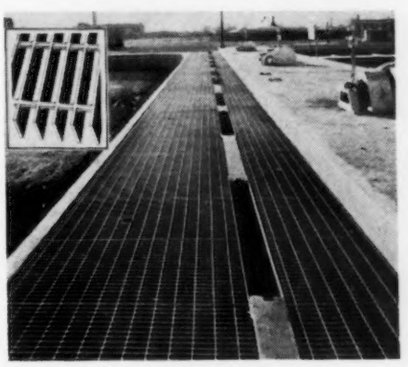
suitable for air, water, oil spray and steam pressure service. It comes in 50-ft. lengths on accurate steel mandrels.

Industrial Deodorant

OAKITE Deodorant No. 1, made by *Oakite Products, Inc.*, 22 Thames Street, New York, is a dry, white, free-flowing powder used in cold water that has a triple acting effect, combining deodorizing, detergent and disinfecting properties. Odorless itself, the material not only dissipates and neutralizes odors without masking or covering up one odor with another, but also provides effective dirt and grime removal action on cement, tile and porcelain surfaces. Its disinfecting properties are said to help protect against harmful organisms.

Welded Steel Floor Grating

A NEW one-piece construction, welded steel floor grating, made by *Wm. F. Klemp Co.*, 6601 South Melvina Avenue, Chicago, was recently announced. This grating is made in all widths and lengths to suit requirements. A hexagon rod set on edge in the edge of the flat bearing bar provides a



non-slipping surface, and there are no sharp corners to collect oil or dirt. This new welded grating is made with the main bars on 1 3/16 in. centers and the cross bars on 4 in. centers, in panels 24 in. wide and in lengths up to 35 ft. A safe load table is furnished for bearing depths and thicknesses to meet requirements.

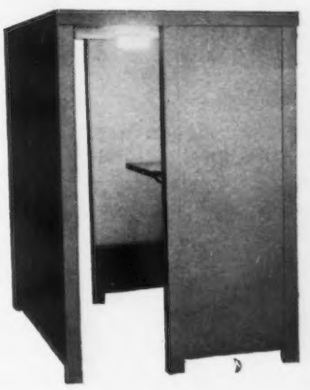
Machine Carriers

TO eliminate production inefficiency resulting from time losses incurred while work in process is moved within a plant to motors, tools and light machines for subsequent operations, *Warren Steel Specialties Co.*, Warren, Ohio, developed a portable carriage to enable workmen to wheel awkward-to-handle, heavy and lightweight

but hitherto stationary machines, direct to the job rather than carrying the work back and forth. The carriage is constructed of angle iron, channel and heavy gage auto body sheets, welded together. These carriages are available in any practical size, and are useful in factories that are crowded or where more than one man uses the same machine at different times.

Acousti-Booths

TO meet the need for a quiet zone in noisy factories for telephone installations, testing operations, and other jobs that require a minimum of noise, the *Burgess Battery Co.*, Acoustic Division, Chicago, Ill., built this new conference Acousti-Booth. Sound absorbing walls in the booth blot out extraneous noise and allow work to be carried on without noise interference. The doorless entrance at



each end permits ready access to the booth and provides ample ventilation. A folding table and an overhead light fixture adds to its convenience. Outside dimensions are 56½ in. long, 54½ in. wide and 79½ in. high.

Floor Patch

HOLES, ruts and worn places in cement floors can be fixed up readily and quickly with a new development of the *Truscon Laboratories*, Detroit, the "Floor-Patch." This new cementitious material produces a non-shrinking patch which adheres to the surrounding concrete surface. It is adaptable to quick, over-night repairs, as floors may be used for light traffic next morning, and eventually it will set harder than the concrete itself and withstands very heavy service conditions. It may be used on concrete and practically any cementitious surface indoors or outdoors.

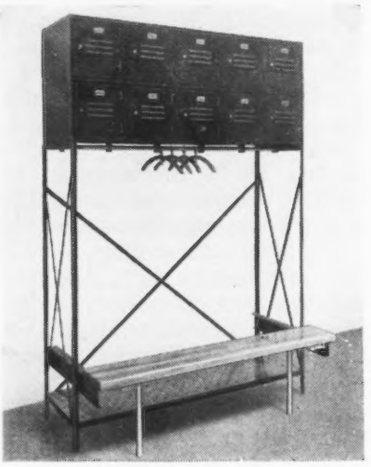
Steel Stool

COMPLETE line of steel stools has been introduced by *Lyon Metal Products, Inc.*, Aurora, Ill., in seven heights from 18 to 30 in. in increments of 2 in. There are 112 models available, built around

an all-welded basic stool with forged steel, dome shaped feet and steel seat. To this stool may be added a pressed wood seat, adjustable steel back, rubber feet, glides or casters.

Steel Lockers

DESIGNATED as the Penn-Kelsey unit by the *Penn Metal Corp. of Penna.*, 36 Oregon Avenue, Philadelphia, steel lockers are being produced which provide complete facilities for 10 persons in half the floor space ordinarily required. This arrangement releases floor space for productive purposes.



Each portable unit has an open coat space 56½ in. high with the coat hangers permanently attached to the rod. There is a perforated metal shoe rack at the bottom, a wooden seat and 10 locked compartments, 12 in. wide, 18 in. deep and 12½ in. high.

Unit Heater

THE *Edwin L. Weigand Co.*, 7500 Thomas Boulevard, Pittsburgh, announces a new type of electric unit heater for operation on 115 or 230 volt, 60 cycle, single phase a.c. The unit is provided with handles or rubber feet for portable use, or brackets for permanent wall mounting. Adjustable louvers direct air in desired direction, and an electric motor drives a quiet, cadmium-plated fan without radio interference. A manual control switch will turn on heater circuit and fan for winter use or fan only for summer use. A thermostat for automatic temperature control is available. This unit is made in a wide variety of sizes rating from 1500 to 4000 watts.

Drill Attachment

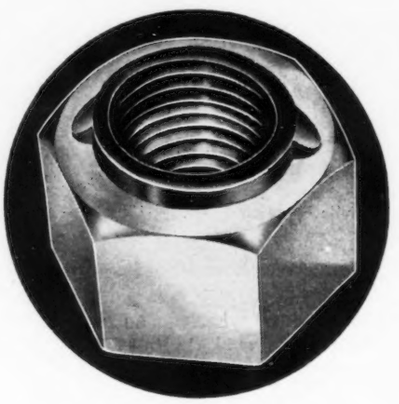
FOR use as an attachment to electric hand drills, the *Kett Appliance Co.*, Union Central Building, Cincinnati, has developed the Kett universal extension. It consists of a telescopic shaft which can be fitted quickly to any hand drill and a head which can drill holes at any angle, being fully adjustable. This tool will be handy especially in building, wood drilling, but also in metal working. A range of five sizes will facilitate drilling holes from up to ¼ to up to 2 in. sizes.

Measured Conduit

TO make electrical installations easier, more accurate, Electrunite Steeltubes of the *Steel and Tubes division of Republic Steel Corp.*, Cleveland, have been provided with a foot rule. This continuous measure is printed on the tube in blue ink. The same company also produces a new bender for these tubes which makes standard radius bends quickly and accurately. The Electrunite bender is a one-piece malleable casting, consisting of a T-shaped curved bracket with a foot-rest. This can be clamped on to the piping, and by a lever movement bends of any shape can be prepared for ½, ¾ and 1 in. tubing.

Self-Locking Nut

PERMANENTLY seated at the head of the standard nut is an elliptically shaped spring steel retainer which locks the new "Security" nut into position. Its slightly out-of-round shape creates permanent pressure when turned



onto the bolt. The nut can be turned on and replaced any number of times without damaging or distorting threads. Even if the bolt should become worn and loose, the lock nuts are said to remain perfectly tight and no amount of vibration will loosen them. The maker is *Security Metal Products, Inc.*, Kalamazoo, Mich.

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See how hinge butts are made from extruded shapes
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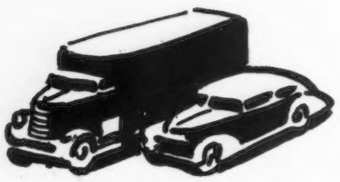
Assembly Line . . .

• New cars show no scarcity of ideas despite burden of the defense program . . . Trend continues to lower, more powerful, more streamlined automobiles . . . Absence of major strikes permits slight increase in production for week.



DETROIT—While the past year of intensive effort on defense has restricted automotive changes somewhat, the number of normal changes plus those forced by priorities and shortages of material probably brings the total up to par.

Of course, most of the design changes that are seen in the new models were instituted before automotive restriction was considered a likely reality. Virtually all of them were made early last season while tool and die shops had nothing else to do and would have laid off mechanics if the new model work had not been done.

The new models being sold today probably will not be as thoroughly examined by the public as in normal years because cancellation of most of the automobile shows removes the opportunity for easy inspection of a great variety of makes and models. A check-up reveals, however, that there has been no paucity of ideas in the industry's designing rooms.

The trend has been to more stream-lining, lower cars, more powerful but more economical engines, and improved performance. The fluid coupling, or something similar to it, is being offered by virtually every manufacturer, as predicted. The one upset to forecasts is the survival, even a surprising increase, in bright metal. Already, however, the word has gone out that this must be eliminated and its disappearance by the first of the year is forecast.

THE streamlining is claimed by engineers to be a real improvement in terms of economy and performance. Packard, in particular, has run an exhaustive road test to demonstrate better gasoline mileage, greater top speed and reserves of usable power, and better handling characteristics of its Clippers because of streamlining.

It is a poor year, indeed, that produces no "trend." On that basis the current new models have something worth while to offer. It is the change in design of fenders and body that have finally taken the bold step which probably will lead soon after the war to important changes in automobile body design and manufacturing technique.

The trend is traceable all the way back to the Chevrolet of 1937 and 1938 which had a "speed line" crease through the front door panel. This speed line had no other reason for being, except the choice of an artist and the fact that it would be difficult for any competitor to copy such a feature, even if he had wanted to. After a year or so this feature disappeared but it has made its reappearance in a much accentuated form. The Packard Clipper, introduced last spring, and all of the 1942 General Motors cars feature a fender streamlining that carries the front fender design back into the door panel. The ultimate in this form of fender design is in the Buick Series 50 Super and Series 70 Roadmaster convertible coupes and sedanets. The front fenders are carried into the door panel and all the way back to the rear fender. The line of the front fender is even carried through the rear fender as a character line and joins up with the rear fender shield line.

Aside from artists' sketches, there has been nothing on wheels that compares with this streamlined appearance. It is a fair enough appraisal to say that such fenders are impractical and flossy if you feel that way about it, and many do, but it is impossible to overlook the design trend forecast by this design.

The fender design ties in with another trend in automotive body building—the constant widening of bodies to provide more room for passengers, and the lower, wider, appearance.

ENGINEERS confirm the fact that these are undoubtedly evolutionary steps looking toward the complete disappearance of the fender—or perhaps it is better expressed by saying that the body and fenders ultimately will merge into a composite unit.

Mechanically, this is also forecast by the method of stamping the rear

A BODY DESIGN trend is indicated clearly in 1942 models on which fenders have become more flowing in line. The extreme is exemplified in this highly streamlined 1942 series 70 Roadmaster convertible coupe introduced by Buick. What this trend in design may lead to is discussed in today's "Assembly Line."

fender for the Packard Clipper model. The fender stamping is integral with the rear quarter panel, so a single piece of sheet metal runs from the door opening at the side of the car around to the trunk lid at the rear. When the ultimate auto body form is reached there will be many other similar changes in body stampings.

Aside from styling and possible changes in manufacturing technique and assembly operations, this trend opens the path for providing a complete rearrangement of accessories and special units now installed inside the passenger compartment. Whether or not engines are finally placed in the rear of the chassis, such designs will provide more seating space, and—at ankle level or lower—will make available a lot of space that won't be needed by passengers but can be used for installation of radios, heaters, batteries and air conditioning units. Not only the possible air conditioning unit of the future, but also the heaters and air filtering devices now employed, will require larger and more powerful fans or blowers and more adequate ducts to direct the conditioned air to desirable locations in the passenger compartment.

This 1942 trend is a major one and certainly amounts to much more than a mere appearance change. It will prove ultimately to have some very utilitarian aspects.

As mentioned, the auto shows have been cancelled in most cities, but various local showings are being substituted. In Detroit dealers are staging an open house this week—Oct. 11 to 18—with parades and public exhibits of new models.

DEALERS are feeling the effects of curtailment, according to reports of factory sales for the month of September. General Motors sale of cars and trucks in the United States and Canada, including export shipments, total 89,300, compared with 124,692 in September of last year. This is quite typical for the industry. Retail deliveries reported by Studebaker (passenger cars and trucks in the United States) show sales of only 6791 units compared with 7667 in September last year. The outlook has the dealers and their employees worried.

$183-Million Plane Engine Job To Ford

Washington

• • • The War Department announced award of a contract to Ford Motor Co. for aircraft engines and spare parts, totalling $182,955,559.

The contract approved by the OPM covers the manufacture of Pratt & Whitney type engines which have been manufactured by Ford under license of United Aircraft Corp., Pratt & Whitney Division.

The middle of this week was supposed to bring OPM's announcement on the January schedule for passenger car production. According to information that has been available, the January schedule probably will be the same as December, or about 204,848 (see approximate schedule published in the "Assembly Line" Sept. 11, 1941).

Absence of major strikes during the week permitted automobile production to increase slightly to 79,065 passenger cars and trucks for the period ended Oct. 10, compared with 76,820 and 108,457 in the corresponding week of last year, according to Ward's Reports, Inc. Last week's output was the highest since the model changeovers began in August.

Truck production is being continued by the automobile industry on an expanding scale because the manufacture of trucks, other than light delivery vehicles, is not restricted and delivery of materials is relatively assured. The General Motors Truck & Coach division has found it necessary to make expansions of its production facilities to satisfy increasing demands for defense and domestic civilian use. J. P. Little, vice-president, says that the division—while producing thousands of six wheel Army trucks each month—has increased domestic production to a pace where deliveries to consumers are running currently 31 per cent ahead of 1940. Production facilities and employment have been more than doubled within the past year. This factory has more than 3,500,000 feet of floor space, including five new additions for defense work. Employment is above the 11,000 mark.

ASSEMBLY PROCEDURE has been changed at Cadillac to meet manufacturing problems arising from the new 1942 designs which have fender bumpers (guards) on rear fenders and fender extensions, or caps, on front door panels. Part of the assembly line was revamped, lengthened, and a distinct hump built into it so workmen may attach the new elements without stooping or working in uncomfortable positions.

FEW changes in truck design were made this year by the truck companies. General Motors plans no new model announcement this fall. Truck builders are likely to make only such mechanical improvements as are desirable from time to time and let it go at that.

Attempts at welding aluminum parts for aircraft have been handicapped by the pick-up of metal on the welding tips and the necessity for frequently dressing the points. In an attempt to overcome this, Progressive Welder Co., in Detroit, has made available some refrigerating units that reduce the electrode temperature to a point where the electrodes are continuously covered with frost. This reduction in temperature is said to permit 10-minute runs of spot welders at 100 welds per minute, without point dressing, using the combination of the Progressive three-phase alumi-

Photo by British-Combine

Photo by British-Combine

NEW HALIFAX BOMBER: This Handley Page Halifax, one of the new 4-engined bombers of the RAF, has a span of 99 ft., a length of 70 ft. and height of 22 ft. It is powered with four Rolls-Royce Merlin engines.

LEFT

12-GUN FIGHTERS: The Hurricane II, a new fighter plane being used by the RAF, is equipped with a new Merlin engine and with 12 machine guns. Another model of the same plane has four 20 mm. cannon.

num welder and the new refrigerating unit.

Army aircraft programs in Detroit—Ford reports consistent rapid progress, with promises to produce the first ship for delivery in May. This would indicate that Ford is having more luck getting data from Consolidated on the B-24D bomber than Fisher Body, Murray Corp. and Chrysler are having on the various airplane parts they will build. Murray has completed two wing panels as far as it can go with present available data and it is understood to have received shipping instructions from Douglas so the wings probably are on their way west now. The tie-up seems to be attributable to delay at Douglas incident to getting approval from the Army on some of the final data. Finally Douglas decided to get the wings shipped to its plant and complete them there after it has obtained the necessary Army approvals.

THIS is the week in which the UAW-CIO should announce the final results of the referendum among members on the question of an additional assessment of $1.00 per member. The $1.00 assessment was recommended at the convention in Buffalo in August but final decision awaited votes to be taken by each local group at meetings before Oct. 15.

Despite monthly public reports of the payment of about $120,000 by Ford Motor Co. to the UAW-CIO under terms of the union check-off agreement with Ford, the union issued the following in a special bulletin to members recently.

"The present income of the UAW-CIO, including per capita from newly organized Ford local union *is barely sufficient* to maintain present operations of the International Union. The International Union must have this assessment if the victories for the organization of workers now in fields of its jurisdiction is to go forward." (The italics are not included in the union bulletin).

National Stamping Design Saves Vital Defense Metals

Detroit

• • • **Among contributions** of manufacturers toward the conservation of metals vital to defense is the development, by the National Stamping Co., Detroit, of a new ammunition clip for the Bofors anti-aircraft gun.

The clip was originally a die casting of zinc and aluminum. The stamping company's engineers redesigned the clip so that it is now made entirely of stampings and weighs the same as the previous design. On the company's first order from the Navy, almost 4,000,000 lb. of vital metals, enough to make an entire fleet of airplanes were saved.

Non-Metallic Substitute For Aluminum Announced

Detroit

• • • **Development of a non-metallic** material designed to replace aluminum in many important defense uses has been revealed by the United States Rubber Co. Defense production orders for this new material, designated simply as formula C-102 are now being negotiated, according to Emmett Sheahan, general manager of the tire division of the company in Detroit.

The new formula, except for small amounts of rubber, is made of non-strategic materials which are farm grown. The substance is fibrous and rubber-like and its ingredients are organic materials.

C-102 has been approved in tests by the Army, Navy and Bureau of Aeronautics. Its tensile strength is 60 per cent of that for aluminum but it is one-third lighter than that metal.

Additional qualities include an absence of crystallization under vibration and freedom from corrosion and pin-hole formations. Despite penetration by machine gun bullets the material does not open up in the flowering typical of aluminum sheets.

This material is fabricated in sheets, is formed under heat and pressure. It is now made in panels less than ⅜ in. thick and up to 60 in. wide.

WHAT *Carpenter* IS DOING TO HELP YOU GET THE MOST OUT OF STAINLESS STEEL

AT a time like this, getting the most out of the metal you use is not only important to your own production problem, but to national defense as well.

There are several ways by which we at Carpenter are attacking this problem as far as Stainless Steel is concerned.

First, by continuing to maintain our rigid quality control over operations greatly expanded to meet new capacity requirements. This means that the strip and bar stock reaching our customers can be counted upon to have the same uniform fabricating qualities as always.

Second, through a service program which aims to help Stainless users select the analysis that will best meet their particular fabrication and corrosion resistance requirements.

Third, by making available metallurgical and engineering assistance in solving new and different problems of fabrication. This helps prevent trouble *before it starts,* conserves metal for vital defense needs, and speeds production.

It is our earnest desire to have you make full use of our service department and our technical assistance. Your Carpenter representative's experience, covering a wide range of Stainless production problems, is yours for the asking.

Printed working instructions on each type of Carpenter Stainless are available to provide your production and engineering departments with many helpful, time-saving suggestions. Questions concerning cutting oils, grades of abrasives, deep drilling methods, and a host of other Stainless fabricating problems are answered in Carpenter's service literature. If you do not already have this helpful information, ask your Carpenter representative for it.

THE CARPENTER STEEL COMPANY, READING, PA.

TO THE DESIGN ENGINEER WHO IS LOOKING TO TOMORROW . . .

After the emergency, Stainless will be honorably discharged from its defense service. Then there will be hundreds of products waiting for it. Forward-looking design engineers are planning now to cash in on the Stainless World of Tomorrow, by preparing to give their after-the-war products the sales appeal (profit appeal) of Stainless Steel. Ask for your copy of this booklet containing practical hints on Stainless design. It shows how to design Stainless products for greater economy . . . how to avoid many fabricating difficulties . . . how to get the right finish.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington . . .

• Progress of defense subcontracting in industry discouraging so far . . . Government departments seen as worst offenders in overordering scarce materials . . . Shift to war production unavoidably injurious to small business.

WASHINGTON—This talk of "big plants" taking the lion's share of defense work not only is answered by the statement that this is natural and inevitable but the reply can be further made that many if not most of them are only too eager, wherever it is possible, to divert the work to smaller plants. Some success is being experienced in this direction as the result of "pooling plans" of small, efficient plants in different communities that have determined their capacity for defense production. But as an overall situation, progress of the subcontracting plan is discouraging.

Big plants would like only too well to turn back to normal, healthy civilian work if that were possible. It would mean no dislocation of operations, irritating government red tape, and other disturbances that are not confronted under normal conditions. Economically, too, civilian work is more profitable. Most small plants do not have the skilled labor and the equipment that are adaptable to defense work, or can be readily diverted for many kinds of such work. Even many large plants, modern and well equipped in every respect for commercial work, have difficulty in preparing for defense work.

THIS fact was strikingly brought out by General Motors President C. E. Wilson in testimony last month at Detroit. Testifying before the Congressional Committee investigating migratory problems, Mr. Wilson said that a make-ready period of nine months or more often was necessary before defense production on certain items could begin. This being true of a large, efficient, thoroughly equipped industrial plant such as General Motors has, it emphasizes the inability of small, inflexible plants, without the necessary equipment or labor, to turn to large-scale, intricate defense work. As for folderol about wholesale reduction of defense work in large plants and "distributing" it among small business, this might in some instances be due to ignorance of organized industry and the difficult problems of shifting to defense production. But much of it is the rankest sort of demagoguery indulged in by politicians who think of their own hide before they show any concern about the nation's defense.

Mr. Wilson exonerated both the government and industry of blame for the lag in getting production under way. The fact, as he pointed out, that no more than 15 per cent of automotive equipment could be diverted to defense production and that in many cases new plants were necessary for this specialized work, shows clearly how small plants are put out of the picture when it comes to widespread subcontracting of difficult defense work. It points to the inescapable fact that shifting a nation to war production, necessary though it is, is in an economic sense, especially disastrous to small business and casualties already are being reported by layoffs and shutdowns not only because priorities shut off materials for civilian demands but also because many small plants can't do defense work. Lack of these materials for civilian use of course are hitting large plants, as is seen by the Ford Company layoff due to curtailed passenger car production.

Photo by International News

WANTS A WAGE CEILING: Marriner S. Eccles (above), chairman of the Federal Reserve Board, recently told the House Banking and Currency committee that the United States cannot escape inflation without some form of control on wages.

THERE distinctly remains the job of working out if at all possible—and many think it is possible—of distributing raw materials more widely among civilian consuming industries, especially the smaller ones. The belief still prevails, defense hysteria to the contrary notwithtanding, that there is excess ordering of so-called scarce materials and that government departments are the worst offenders.

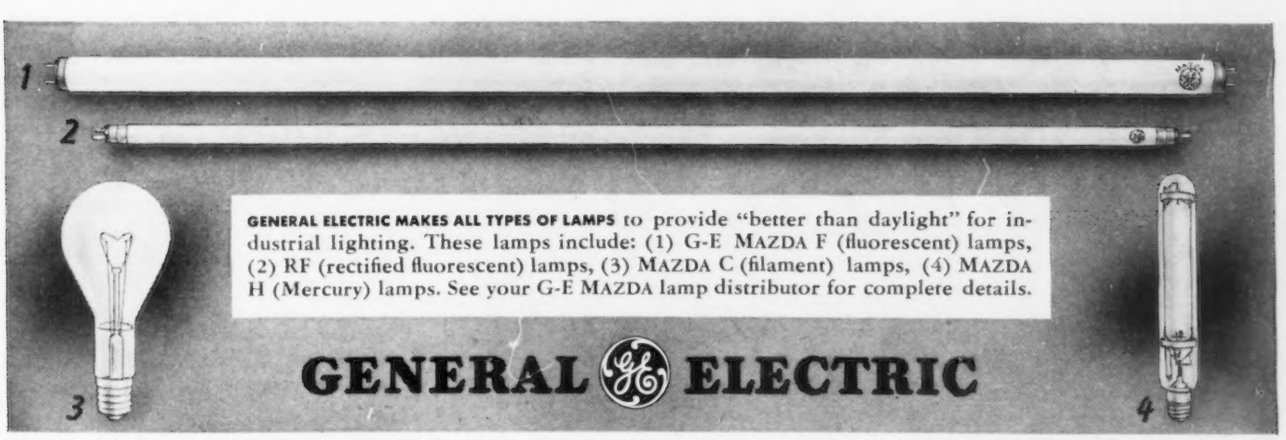
There can be no doubt that some of the shortages are real. They are, however, reported so widely in almost every line that there is a growing doubt whether many of them are actual or necessary, or if actual, the belief prevails by many that the shortages could be either wiped out entirely or greatly relieved by more orderly flow of supplies.

TEXTILE MACHINE PLANT GETS *"Better than Daylight!"* BY COMBINING G-E MERCURY AND INCANDESCENT LAMPS!

Thirty porcelain enamel reflectors each containing a 400-watt mercury lamp and three 200-watt incandescent lamps light the high bay area. In the low bay areas similar combination units each contain one 250-watt mercury lamp, and three 200-watt incandescent lamps.

THE TEXTILE MACHINE WORKS at Reading, Pennsylvania, gets "better than daylight" illumination by using G-E MAZDA H (mercury) lamps and G-E MAZDA C (incandescent) lamps in combination lighting units in both high and low bays.

Let General Electric show you how you can speed production, reduce errors, and improve morale in your plant with higher level lighting that is "better than daylight" because it is efficient, economical, and dependable 24 hours a day. Your local electric service company or your G-E MAZDA lamp distributor will show you how to get these higher lighting levels, either with incandescent, mercury, RF, or G-E MAZDA F lamps, or a suitable combination . . . *engineered* to your needs.



GENERAL ELECTRIC MAKES ALL TYPES OF LAMPS to provide "better than daylight" for industrial lighting. These lamps include: (1) G-E MAZDA F (fluorescent) lamps, (2) RF (rectified fluorescent) lamps, (3) MAZDA C (filament) lamps, (4) MAZDA H (Mercury) lamps. See your G-E MAZDA lamp distributor for complete details.

Navy Moves to Take Over Hunter's Point (Cal.) Dry Docks

Washington

• • • **The Navy** announced last week that Hunter's Point Dry Docks, now operated by Bethlehem Steel Co., San Francisco, will shortly be placed under the direct supervision of the Commandant of the Mare Island Navy Yard. The change is due primarily to emergency needs on the West Coast for docking and repair facilities for large vessels.

In 1939 Congress authorized the Secretary of the Navy to acquire the two graving dry docks, together with approximately 48 adjoining acres, for a sum not to exceed $4,000,000. At that time the property was owned by Bethlehem and operated in conjunction with its Union plant. In December, 1939, negotiations were completed and the purchase consummated, but in order to allow a transition period an agreement was made to lease the docks back to Bethlehem for three years, beginning in November, 1940. The agreement provided the lease would be revocable at any time within the discretion of the Secretary of the Navy. However, it was pointed out the Navy would not exercise this right except in the case of a grave emergency.

On Oct. 1, 1941, the Navy revoked the lease with Bethlehem.

The Navy will take formal possession upon completion of negotiations for certain equipment belonging to Bethlehem, and as soon as the property can be vacated by Bethlehem.

German Mills Fail on Ship Plates for Sweden

Washington

• • • **Failure of** German steel mills to provide Sweden's ship yards with the agreed volume of ship plates constitutes a serious threat to that country's important shipbuilding industry, the Department of Commerce has reported. Germany was to deliver 50,000 metric tons of ship plates during 1941, plus the quantities which it failed to deliver in 1940. Very little of the 1941 quota has been delivered to Sweden, while a fairly large part of the 1940 quota still remains to be shipped.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YEH, IT'S A NICE LOOKIN' HOUSE AN' THE RENT IS REASONABLE -- YOU KNOW WHERE CARBON STREET IS--WAIT, I'LL DRAW YOU A SKETCH HOW TO GET THERE!
NO-NO! DON'T INVOLVE ME IN ANY SKETCHES! I'LL FERGIT IT, BUT TELL ME, JUST TELL ME! BURN THAT THING!
THAT SOUNDS LIKE HORSE PLAY, BUT I DON'T WANT ANY MAPS ON ME WHEN I GO OUT PAST THEM DICKS AT TH' GATE!
IF THEY HAD ART CRITICS 'STID OF COPS AT TH' GATE, A GUY WOULDN'T BE DELAYED ANY LONGER THAN A MAYOR WITH A PARKING TICKIT!
DYNAMITE
J.R.WILLIAMS 10-17
COPR. 1941 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

British Use More Plastics in Planes

Washington

• • • **British airplane** manufacturers are using plastic material to an increasing extent to replace light metal alloys, according to a report to the Department of Commerce. After the evacuation from Dunkirk intensive rearmament resulted in an exceedingly heavy consumption of light alloys, thus providing an unparalleled opportunity for the introduction of plastics.

That plastic manufacturers have achieved a marked degree of success in satisfying the demands of the British aircraft industry was indicated in a technical display recently held in London under the auspices of the Society of British Aircraft Constructors. One of the features of the display was the increased use which is being made of synthetic resinoids for bonding and reinforcing wood and fibrous materials. One material known as "Pytram," a cellulose fiber, light in weight, strong and resilient, is reported to have been found very satisfactory. Shapes of all types with double curvatures can, it is said, be easily produced from it, while its ability to withstand moisture and vibration is marked.

DPC Approves Leases For Five Defense Plants

Washington

• • • **The Defense Plant Corp.,** RFC subsidiary, has approved lease agreements with the following companies:

General Electric Co., $25,011,838 for constructing and equipping a plant at Fort Wayne, Ind., for aircraft production; and $744,735 for plants at Fort Wayne, Ind., and Philadelphia for the manufacture of aircraft equipment.

General Steel Castings Corp., Eddystone, Pa., $14,000,000 for an ordnance plant at Granite City, Ill.

Extruded Metals Defense Corp., Belding, Mich., $6,266,000 for constructing and equipping a plant at Grand Rapids, Mich., for the manufacture of extruded aluminum alloys.

Goodyear Aircraft Corp., Akron, Ohio, $499,889 for acquisition of machinery and equipment for an aircraft equipment plant at Litchfield Park, Arizona.

Wellman Bronze & Aluminum Co., Cleveland, a $110,072 increase in the present lease agreement covering a plant in Cleveland engaged in the production of magnesium castings.

Commercial Plane Output Mapped by SPAB

Washington

• • • **Covering the** 18-month period beginning Jan. 1, 1942, the SPAB-approved commercial aircraft production program provides for the construction and delivery of 156 DC-3's, 52 Lockheed Lodestars and 20 DC-4's. Provision was made that if the Army needs the planes on their completion it may have them and if their construction interferes with construction of army planes or other goods for the army, the latter's orders are to have the right of way.

The planes will be built with special reinforced flooring and wide doors so that they may be adapted to use as military transport planes in case of need.

Six New Cargo Ships To Use 26,000 Tons Steel

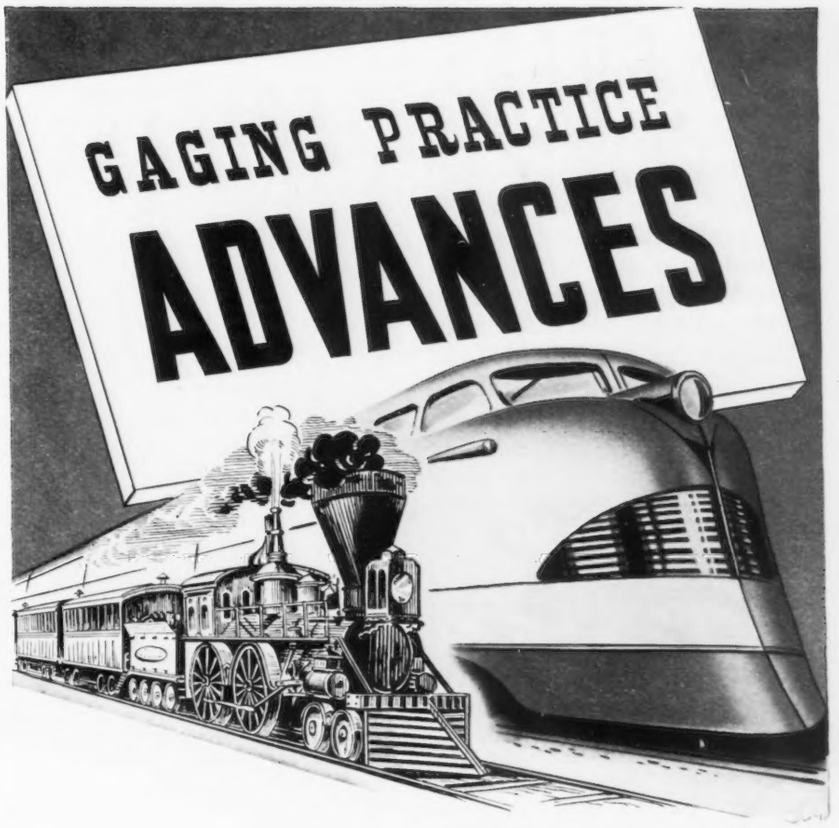
Washington

• • • **Approximately** 26,000 tons of steel will be required for the six C-3 cargo ships to be built by Ingalls Shipbuilding Corp., Birmingham, Ala., at its Pascagoula, Miss., yard. Contracts were awarded by the Maritime Commission at $3,160,000 each. The ships will be the largest and fastest of their type designed by the commission and will be delivered during 1943. They will be turbine-propelled, displacement 17,615 tons, 492 ft. in length with a beam of 69 ft., 2 in. Their engines will develop 8500 hp. and they will have a normal sea speed of 16½ knots.

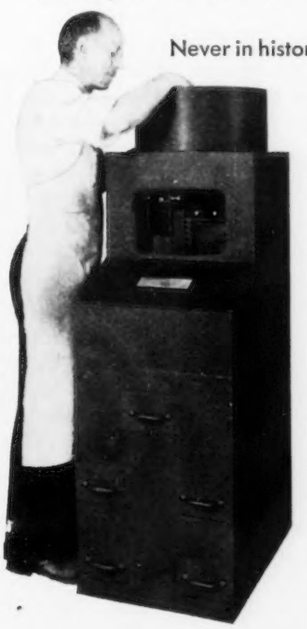
OPM Recommends Mahoning Dam To Aid Steel Output

Washington

• • • **Construction of a** $7,000,000 dam on the Mahoning River to assure a steady water supply of 165,000,000 gallons daily for eight Ohio steel companies producing 10 per cent of the country's steel supply has been recommended by OPM Director-General William S. Knudsen in a letter to the War Department. War Department approval is the only remaining step necessary to start construction of the project. W. A. Hauck, OPM steel consultant, said that constant losses in production in the valley, due to lack of water, have been reported to OPM.



Locomotives have improved vastly since those ambitious little wood burners struggled across the Union Pacific in the early 70's. The streamliner of today can do far more and do it much faster.



Never in history has progress been made more rapidly in precision gaging than in the last few years. Both standards of accuracy and gaging speed have made spectacular advances. The human equation, such an unpredictable factor just a few years ago, becomes much less troublesome.

Sheffield has its part in this march of gaging progress. It was Sheffield which produced the automatic gage illustrated—also the Electrigage, the Multichek Electrigage, the Precisionaire, the Thread Lead Checking instrument and others. If you are not familiar with what these instruments have accomplished in increased accuracy and faster inspection, write us for the story.

THE SHEFFIELD CORPORATION
Gage Division · DAYTON, OHIO, U.S.A.

SHEFFIELD MASTER GAGEMAKERS

WEST COAST . . .

• Coast industries ask, "What material shortages?" . . . Survey shows that no plant of any size in West has been forced to curtail because of scarcities . . . Priorities found merely a "ticket to stand in line."

SAN FRANCISCO — It may be blasphemy to introduce a cheerful note into the dirge that is being sung over industrial concerns forced to curtail their activities because of insufficient materials, but diligent inquiries by THE IRON AGE have failed to reveal a single West Coast metal working concern larger than the backyard category that has had to close up so far.

For months now wide publicity has been given to manufacturers who have said that they would have to close within 30, 60 or 90 days unless they were able to get materials. That story is still universal with large and small firms alike, and the truth of these assertions cannot be denied. Nevertheless, until the present time these concerns, frantic under the shadow of a threatening future, have been able to divert their activities, make substitutions of materials, or make other adjustments to enable continued operation. The ingenuity of management has been taxed as never before, and it is a credit to production executives as a whole that they have been able to keep shops working.

Talking with a wide range of concerns, it is evident that few have been able to get all the material they would like. Nearly all report turning down orders. But no one has had to retreat more than temporarily from a high level of production which two years ago would have been regarded as heaven.

ASSIGNMENT of priorities on a broad scale during the last 90 days has allayed the fears of many who foresaw a gloomy future. Now that priorities are almost universal, it is difficult to determine whether the chances of the average man to get material have been improved, but the psychological effect has been stimulating, and production has been diverted into defense channels as it would not otherwise have been. In California, at least, some of those people who have been having the most difficult time in obtaining steel have been those with the highest priorities, such as the shipbuilders. As it becomes more widely evident that priorities are just a ticket to stand in line, and as allocations are made on a broader scale, a swelling chorus of complaints may be heard unless wider publicity is given to the actual facts rather than the potentialities of the situation.

It cannot be denied that the potentialities of tomorrow are grim, but up until now tomorrow has never come.

Until actual shutdowns are made, the question can be asked as to whether industrial jeremiads, in this section of the country, at least, are of benefit to the morale of industry, and as to whether the widespread panic that has been created by dire predictions for the future is not actually detrimental.

Some very small shops have had to close in the Los Angeles area but the loss to industrial economy in the terms of idle equipment has been minute and it may be safely said that not one man has been permanently added to the ranks of the unemployed. One well informed agency considers that shutdowns of backyard shops have been due as much to lack of financing as to lack of materials.

PACIFIC coast foundries have become entirely dependent upon blast furnaces east of the Rocky Mountains for pig iron. The single blast furnace west of the Rocky Mountains, which has supplied a large part of Pacific Coast foundry requirements, is now devoted entirely to the production of basic iron for the mills of its owner. This switch from merchant production is said by the operator to be due entirely to the desire to keep the furnace in operation as long as possible before blowing it out for lining repairs. In anticipation of this period when the furnace is out of production, the owner must necessarily provide sufficient stocks of basic iron for his own needs. This entirely unavoidable loss of its sole merchant iron producer throws the far West more than ever upon Eastern facilities. Demonstrating just how serious the effect any interruption of production due to labor disturbances in the Eastern part of the United States might be upon the delicate balance wheel of production, Pacific Coast foundries which have been allocated pig iron from Eastern producers would feel the backwash in delayed deliveries. Both the pig iron and cast scrap situation is extremely serious on the West Coast from the Canadian border to the Mexican line. In most cases, pig iron stocks on hand are sufficient for 30, 45 or 60 days, but beyond that period will be dependent upon allocations. A Los Angeles manufacturer of cast iron porcelain enamel ware, one of two west of the Rocky Mountains making this type of product, reports that it will be unable to carry on its principal function of supplying government military and defense housing projects unless relief is given. IRON AGE has definitely confirmed that a Seattle foundry last week paid $38.00 per ton for pig iron, but it was not determined what proportion of this represented freight charges.

Foundries continue to scrape bottom for lack of cast scrap, but as yet none has gone on the rocks. Whatever temporary stability has been afforded by the OPA price ceiling is seriously threatened and the price situation may go entirely out of control in all of California at any moment.

FOUNDRIES in the San Francisco district, where the market price has stayed relatively close to the OPA ceilings, complain that Los Angeles scrap dealers have raided the northern territory and demoralized the market with offerings far out of line with the OPA

schedule. An actual instance is reported, but has not been verified by IRON AGE, in which $35.00 a ton was paid for cast scrap by a Los Angeles foundry. This is slightly more than double the OPA ceiling of $17.41 per net ton. Numerous transactions are reported at about $25.00 per net ton.

In Seattle, foundries are sending out their own trucks to make scrap collections. This practice is expected to become more prevalent in areas where former marginal scrap collectors have taken regular jobs in defense industries. The practice of consumers making their own collection also allows payment of a legally higher price to the original supplier of the scrap in that the dealer's margin is eliminated.

At Seattle, the percentage of material being salvaged by scrap yards continues to increase and used shapes, channels, and angles, usually classified as scrap, are selling for 3½c. a pound.

Supplies of open hearth scrap seem somewhat more abundant in relation to demand than cast scrap, although they are far from plentiful, and the situation threatens to become critical on short notice at almost any time. One mill is reported to have only two weeks' supply on hand. Pacific Coast mills are generally favorable to the remote scrap ruling but the exclusion of California, Oregon, and Washington from the territory affected by the ruling greatly limits its advantages. It is reliably estimated that at the outside not more than 25,000 tons of scrap will be made available for Pacific Coast mill consumption by the remote scrap ruling, most of this coming to California mills from Arizona and Nevada. Remote districts in California probably contain 50,000 tons of scrap that will not be made available by the ruling. The entire state of Oregon remains sterile as a possible scrap source under the ruling. The trade generally seriously questions the wisdom of delineating remote areas by state boundaries. For instance, scrap from Reno, Nev., can readily move to northern California mills under the ruling, while large accumulations in the Sierra Nevadas, northern Sacramento Valley, and north Coast districts remain dormant. Scrap from the mining industry, believed to be a substantial tonnage, lies mostly within the mountain areas of California which are out of bounds under the present setup as far as effective movement is concerned. If the remote scrap ruling were amended to define as remote areas parts of the state of California, Oregon, and Washington where the present freight rates are in excess of $1.50 to $2.00 per ton to consuming points, the flow to mills would be greatly expedited.

Photo by British-Combine

TUBULAR HAND BRIDGE: Some U. S. manufacturer might want to make portable bridges like those shown above. They consist of tubular girders and are now being made in England for use of the army in crossing small streams.

MANY former common steel shapes and sheets have vanished from the Seattle market. For instance, no 12 gage sheets, no 3 or 4 in. channels, and no 3 x 3 x ¼ in. angles are to be had.

Boeing Aircraft Co., Seattle, reports that it has hired 10,000 new employees in 10 weeks. More than 21,000 now are employed by Boeing producing Boeing's B-17E Flying Fortresses and Douglas-type Boston III attack bombers. The hiring splurge occurred as work on the Boeing B-17E's emerged from the parts manufacturing stage into major sub-assembly and final assembly stages. During one week 1450 persons were registered, 1150 received placement interviews, and 800 were hired. Flyaway delivery of B-17E's began September 30 when three planes left Seattle for Dayton, Ohio, for further testing by the materiel division of the air corps. In its expanded Seattle plant alone, Boeing has installed during the past year more than nine million dollars worth of new production machinery, assembly jigs, dies, machine fixtures and other production equipment.

At Los Angeles, consolidation of Lockheed Aircraft Corp. and its 50.46 per cent owned subsidiary, Vega Airplane Co., is reported to be under consideration in order to effect engineering and management economies. These sister companies, incidentally, are regarded as a fine example of the extent to which sub-contracting can be carried. In the 1941 program for the two firms, there have been 882 sub-contracts allotted, representing 37 per cent of the total value of new plane contracts. While this percentage represents all work done outside of the plant, including regular small parts orders, the actual contracts farmed out on work normally done within the plant went to 182 firms, representing 12 per cent of the total. It is further reported that when Vega gets into production on its cooperative Flying Fortress contract next year, farmed out work and parts will represent nearly 65 per cent of the total cost.

Commercial production of metallic magnesium commenced Oct. 8 at the Los Altos plant of the Chemical Engineering Division of the Todd-California Shipbuilding Corp.

Hycar to Build 10,000-Ton Synthetic Rubber Plant

• • • **A $2,750,000 plant,** which will boost the synthetic rubber production capacity of the Hycar Chemical Co., Akron, Ohio, a joint subsidiary of B. F. Goodrich Co. and Phillips Petroleum Co., to four times the synthetic rubber production in the entire nation last year, will be built near Louisville, Ky., under a contract with the Defense Plant Corp.

The new plant's 10,000 ton capacity will bring Hycar's estimated output to 17,000 tons a year, ten times the country's entire 1939 production. Germany's estimated synthetic rubber production in 1939 was 20,000 tons.

Fatigue Cracks

BY A. H. DIX

Memorable Monicker

• • • To the top of our list of distinctive names goes one we have just run across. It belongs to the chief of the women's interests section of the War Department Bureau of Public Relations—Mrs. *Oveta Culp Hobby.* Each of its six syllables rings as clear and true as the separate blows of a forging hammer.

And each unit of the name has its own individuality. There is no "flow" from one part to the next, as in, for example, *Ella Wheeler Wilcox,* or *Raymond Gram Swing,* or *Batten, Barton, Durstine & Osborn. Oveta—Culp—Hobby*—each member is as faithful to its identity as a grouping of say a Stillson wrench, a shoe tree, and a coffee cake. It is a name we shall store in our mind for use against the day someone says nothing is perfect.

Letter Presses into Shells

May I suggest that you point out to the trade a resource of scrap iron that nobody has thought of yet—the old office copying presses in use before typewriters and carbon papers were of reliable quality. They range in weight from 25 lb. to two or three hundred pounds (in old job printing houses).

They are painted neatly, so never thrown away—just put on a table in the basement or kept in a closet year after year. Every public school up here has one, also insurance offices, banks, coal companies and city halls. Nobody uses them, but nobody thinks of them as scrap. Why not launch the idea?

—*Emily Johnson, Pittston, Pa.*

Miss Johnson takes in too much territory when she says that *nobody* uses letter presses. P. Feiner & Sons, Inc., sheet metal specialist, 522 W. 45th St., New York, does. We have a letter from Mark A. Feiner, secretary of the firm, dated as recently as Sept. 19, 1941, typed in copying ink, and bearing unmistakable evidence of a letter press' fond embrace.

(We would like to shed a parenthetical tear here in six-point over the almost extinct art of letter pressing. True, outgoing letters had to be turned over to the office boy no later than 3:30, so he would have time to copy them before the office closed at 5:30. But it was worth the effort for the impressiveness of each letter was increased enormously by the solemn rite of letter-pressing. A letter-pressed letter is to an ordinary carbon-copy letter as an oh-promise-me church wedding is to an I-pronounce-you-man-and-wife-that'll-be-three-dollars justice-of-the-peace hookup.)

But that is mere quibbling. Today few letter presses are in use and copies of Miss Johnson's letter are being sent to the OPM and to Edwin C. Barringer, exec. sec. of the Institute of Scrap Iron and Steel. Thus Miss Johnson's brain ship is launched, and within a matter of months the souls of millions or dozens of letter presses will enter into army field stoves, captains' gigs, anti-aircraft "ears," and other A-1-A items.

Nautical Taulogism

• • • William H. Griffiths calls attention to the fact that a recent photograph in your favorite family journal was captioned "12 knots per hour." As a knot is a unit of speed it needs "per hour" about as much as a synagogue needs a swastika. Our proofroom constantly catches blunders of this kind but unfortunately this one fell into the hands of a proofreader whose hobby is mountain climbing.

We Hit Eight Digits

• • • The Wright Aeronautical Corp. announces that it turned out 1,780,000 h.p. of engines in the month of August. How many units this is, it doesn't say, but it is probably a h. of a l. So we will heat up the gears on our Burroughs and roll up a boxcar statistic of our own. How many pages did we publish? We make it 12,240,000 pages in August, or 7 pages for every one of Wright's horse-powers.

But if you take this month, which has five issues and one of them last week's 480-page National Metal Congress Number, and with circulation climbing like anything, we will shoot 'way up to 20,000,000 pages. So even if by this time Wright has raised its h.p. up to two million we can still spot it 10 to 1.

Stoppers

• • • "Rip off the roof" roared J. M.—*Robbins & Myers, Inc.*

"Jee" Mystery Solved

• • • Recently we marveled here that the executive personnel list of a certain East Indian metal-working firm had so many names ending in "jee." W. A. M. writes us to stop wondering, as "jee" merely means *son of* Mookerjee, therefore, is simply the son of old man Mooker, just as in Rumania "escu" is *son of,* as in Madame Lupescu. We thought you would like to know.

Nuts Before Division

Long before this letter reaches you, the problem set by Lt. Com. Simpson in your July 10 issue will be in the limbo of forgotten things, but the problem has a family likeness to one which was current in the last Great War, and in connection with which I know a true story which may interest you.

The older problem concerned four shipwrecked sailors, the ship's monkey and a bag of nuts, to be divided equally on five different occasions, with a nut left over each time for the monkey. Now for the story:

A close personal friend of mine, Major Satow, now with Stewarts & Lloyds Ltd., the big British tube combine, was a Brigade-Major in the last War, and on the occasion in question had been "up the line" during a rather quiet spell on that particular front. On his way back he dropped into a dug-out to see his friend the commanding officer of an 18-pounder battery, and found the latter bored almost to tears with the monotony of the war and the absence, for the time being, of any active offensive. Knowing the keenness of this gunner for mathematical problems, Satow gave his friend the problem of the shipwrecked sailors, the bag of nuts and the monkey, and departed, leaving the artillery C.O. calculating furiously. On reaching Brigade Headquarters about couple of miles further back, Satow went straight into dinner. During dinner a telegram arrived for the Brigadier-General, who tore it open and exclaimed, "What a terrible war this is! I have seen so many good fellows driven insane by the strain of it, and now here is poor —— (naming the gunner officer) also completely off his head.

The telegram was passed around amid universal cries of concern and bewilderment, until it reached Satow, who burst into a roar of laughter, to the surprise of the rest of the Mess. The telegram read:

To the C.O., Brigade . . . ., Division ....., B.E.F. DOES MONKEY RECEIVE NUTS BEFORE DIVISION OR AFTER, REPLY.
C.O., No. . . . Field Battery, . . . Brigade, ... Division I have only one sentence to add. The telegram is still in existence.

—*Charles D. Rigg, (formerly Lieutenant in the British Royal Tank Corps) Smith & McLean, Ltd., Glasgow*

Puzzles

The master minds have not yet been heard from regarding last week's submarine problem. The answer to the insult to your intelligence, the one about the chicken, is, of course, 8 lb.

If you can go into a 30-second trance and emerge with the right answer to this one give yourself an A in perspicacity:

Two volumes of a book are placed in their proper order on a bookshelf. Each book has ⅛-in. covers, and all the pages in each volume are 1½ in. thick. How far does a bookworm travel if it starts from page 1, volume 1, and eats in a straight line to the last page of volume 2?

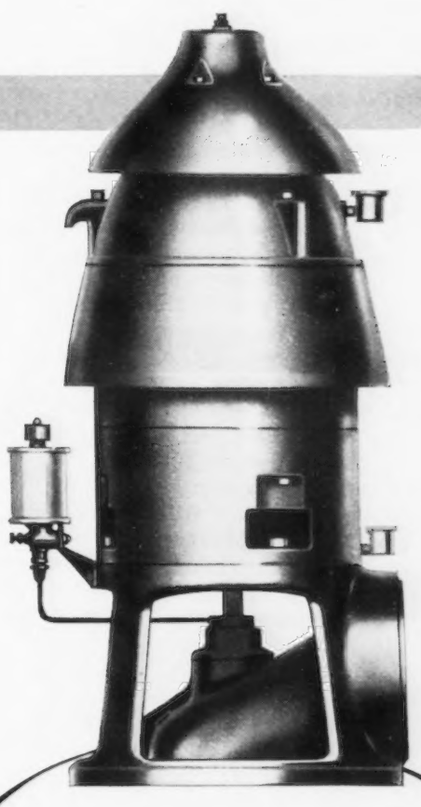
HOW TO INCREASE PRODUCTION

WITHOUT USING MORE POWER . . .

IF YOUR pumps are not of the latest, improved designs, they are probably wasting power which you could use profitably to increase plant capacity.

Ten-year-old pumps of certain types, even if as good as new, take a 25% greater toll at the power meter than today's Fairbanks-Morse models. And 3- or 4-year-old pumps of other types consume so much more power than current models that continued use is not only more costly than replacement, but is intolerable because it dissipates vitally needed power resources.

Before arranging for increased power supply, take every practical step to eliminate power waste. A Fairbanks-Morse Pump Engineer can tell you quickly, without cost or obligation, whether your pumps are the types which waste power . . . which carry such heavy obsolescence penalties that new pumps would pay for themselves in as little as a year. Find out now. Write Fairbanks, Morse & Co., Dept. J38, 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.



FAIRBANKS-MORSE TURBINE PUMPS

Complete range of capacities (35 g.p.m. to 4000 g.p.m.) for electric motor, Diesel or gasoline engine, or steam turbine drive. Open or closed impellers, oil or water lubrication. Today's 6″ F-M Turbine is *23% more efficient* than the same size was in 1927; today's 10″ turbine is *21% more efficient* than the 10″ pump was in 1927!

FAIRBANKS · MORSE PUMPS

DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

This Industrial Week . . .

o o o

NOT all the strong words spoken recently came from European dictators. From a union meeting hall in Gary, Ind., comes a statement that seems as well worth weighing by industry and by the American public as any comment made recently by any world leader.

"There are," declared Van A. Bittner, a high official of the Steel Workers Organizing Committee, "two great defense programs in this country—the government has one and we have one. We look at it realistically, believing that a union which cannot defend itself and its membership cannot be much good in defending the country."

Mr. Bittner, who is a veteran labor leader with full understanding of what his words mean to his union and to the defense program, shed new light on the growing fight for a closed shop and a check-off in the steel producing and consuming industries. First, said he, the SWOC is now in a position strong enough that it need not rely on steel companies "giving" it the closed shop. "We are strong enough to take what we want," said Mr. Bittner. "This is one time that the SWOC has the cards and when we have four aces in our hand we are going to take the pot. We not only can do it now but we will do it now."

"We Have Four Aces"

The SWOC leader also had a word to say about steel plant managers, who seeking to keep their plants running, meet him during the process of collective bargaining. Recently two high officers of the United States Steel Corp. met me in a New York hotel and wanted to talk to me about union members refusing to work with non-members, he said. "That was a great day when two high officials of United States Steel came to me to complain of the strength and power of the SWOC. I told them that they might as well make up their minds that we are going to have all steelworkers in our union."

Great Day For SWOC

Meanwhile events of the last few days upheld Mr. Bittner's contention that there are TWO defense programs. Flash strikes in metalworking plants vital to defense (the national defense program) continued in many industrial areas. In some ways the "union defense program," despite a belated plea by President Roosevelt for industrial peace, was, from the viewpoint of union leaders, making the greater progress. For example, last week's strike at Carnegie-Illinois Steel Corp.'s Gary plant resulted in a loss, which cannot be made up, of 40,000 tons of steel ingots, of more than 30,000 tons of rolled steel products and about 25,000 tons of pig iron.

Steel Loss 40,000 Tons

The steel lost in the Carnegie-Illinois strikes, THE IRON AGE estimates, could have been used to manufacture 2856 fighting tanks, or more than 2200 railroad cars, or 54 submarines, or more than a half million 155 mm. Howitzer shells, or 13 merchant ships.

Ohio strikers this week continued to subjugate the national defense efforts to their particular demands for jurisdictional rights or higher pay. The Midland Steel Products Co. strike continued into its second week, with indications that the wage dispute would soon be certified by Federal conciliators to the National Defense Mediation Board. Meanwhile, this work stoppage had thrown 6000 Studebaker employees out of work at South Bend, and was threatening Willys-Overland output of army "jeeps." The Spicer Mfg. plant at Toledo, producing 70 per cent of combat vehicle transmissions, was idle because CIO workers refused to handle parts made by AFL employees at Spicer's Hillsdale, Mich., plant. Striking truck drivers in Akron, allowed three carloads of caterpillar treads to leave that city for the White Motor Cleveland plant.

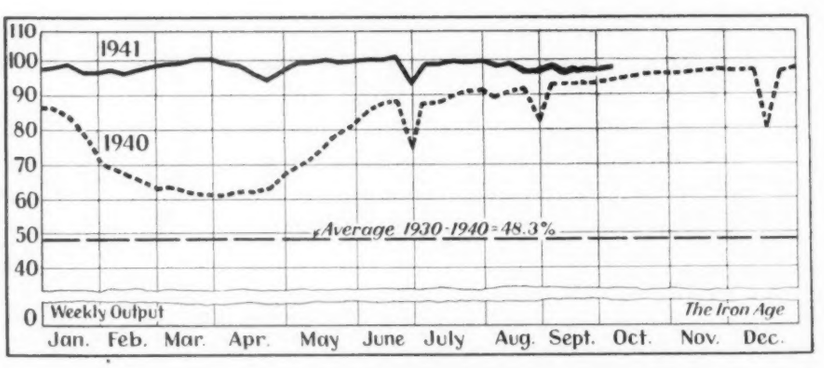
It now seems likely that no agency except the government, expressing the will of the public which believes that the union defense program must give way to the national defense program, can prevent an attempt at a general steel plant shutdown for which the Chicago area has become a testing ground.

Steel Strike Danger Grows

Ingot production this week is estimated by THE IRON AGE at 98 per cent of capacity, a gain of a half point above last week's revised rate of 97.5 per cent, but threats of strikes in several areas, coupled

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts-burgh	Chi-cago	Val-leys	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	De-troit	South-ern	S.Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	98.0	101.0	104.0	90.5	98.0	106.0	93.0	107.5	99.0	96.0	95.0	99.0	110.0	98.0
Previous Week	98.0*	93.0	102.0	90.5	98.0	106.0	93.0	107.5	96.5	97.0	97.0	102.0	101.0	97.5

* Revised

with the possibility of additional openhearth furnaces being forced down because of lack of scrap, suggest that ingot output may fall below 98 per cent before the week ends. Changes in district operating rates are scattered, with Chicago plants scheduled at 101 per cent, rebounding from a decline to 93 per cent last week. Youngstown district plants have gained two points to 104 per cent and the South advanced two and a half points to 99 per cent. Several steel producing areas, particularly Eastern Pennsylvania and Southern Ohio, report minor fluctuations in operations because of lack of scrap.

Ingot Output At 98 Per Cent

Up to mid-week, the OPM General Preference Order M-24, directing the distribution of scrap, had not made much change in the scrap supply picture. As brokers, producers and consumers began keeping records of all iron and steel scrap transactions, in accordance with the priorities order, material was as scarce as ever. The order may work to the advantage of some steel-producing plants making high percentages of defense work. Under the order, scrap producers must report inventories, production and sales; brokers must show inventories, purchases and sales; consumers must show inventories, production and consumption figures. Forms for reporting this information are expected to be available soon.

The question of hoarding of needed materials was given attention this week at the Economic Club meeting in Detroit when Price Administrator Leon Henderson said that claims of over-buying by the Army and Navy, deepening the shortages for civilian industries, "would be investigated." He said that definite action is in prospect. Hinting that alleged shortages of steel and many other materials were probably not so serious, Henderson indicated that higher volumes of all civilian production are likely as a result of firmer controls to prevent inequalities in allocation and a closer check-up of inventories of essential materials. Within a year, Henderson said, 40 to 45 per cent of Detroit's productive capacity will be occupied with defense orders.

Hoarding By Government?

Disagreement with the working out of the defense priorities system at mid-week varied by individual plants, by industries and by districts. In Ohio, Indiana, Illinois and in other areas, metal-working plants were most highly concerned for the continued existence of their businesses under a war economy. On the West Coast, however, THE IRON AGE inquiries showed no plant larger than the alley size had been forced to shut down because of insufficient materials. Up to the present, coast firms for the most part have been able to divert their activities, use substitute materials, or make other adjustments to continue operations. Few of the companies questioned, however, have been able to obtain all the materials they would like to have.

A similar survey of plants in the Cleveland area shows considerable dissatisfaction over inequalities in the defense program. Sharply-rising wages for defense workers was complained of most often. (Leon Henderson said this week that the mechanism of collective bargaining, the pressure of public opinion, administration control and direct government interference would be used to stabilize wages after prices were fixed.) A screw manufacturer at Cleveland told THE IRON AGE that two long employed tool men, receiving $1.12½ an hour with 24 hours overtime each week assured, left for a defense "boom" plant which is paying $1.50 an hour. Such cases can be multiplied many times.

Overtime work has increased during the last few weeks in many plants. OPM Director General Knudsen has asked machine tool builders to work critical tools seven days a week, increase man-hours on night shifts and develop still more extensive sub-contracting. Price Administrator Henderson has called a meeting at Washington for Oct. 22 to discuss with members of the machine tool building industry a proposed schedule of maximum prices on new machine tools. A price ceiling for used machine tools was fixed in February.

For some steel companies the volume of incoming business is running midway between the August level, which was the high point, and the September level, which was the low point in the current movement. The recent upward trend in bookings apparently reflects success on the part of consumers in obtaining priority ratings for essential requirements. Distribution of available steel supplies to the most vital points continues to be one of the toughest problems ever faced by the steel industry, a condition which suggests that eventually direct allocation of steel will replace the priority system or that some simpler distribution system will be developed. Bottlenecks in vital defense items are not hard to find. In one case failure of the manufacturer to obtain small tubing for airplane engine stabilizers is affecting the assembly of airplanes. The inability of some airplane parts makers to obtain Monel metal, while some government agencies are able to obtain what they need of this metal, is also tending to hold up production of certain airplane parts, while manufacturers attempt to find substitutes.

Machine Tool Price Ceiling

Structural steel awards jumped to 23,900 tons from 8400 tons last week, the outstanding lettings being 8000 tons for the Douglas Aircraft plant at Long Beach, Cal., 4505 tons for a Navy hangar at Elizabeth City, N. C., and 4200 tons for a powder plant at Choteau, Okla. New structural steel projects of 12,800 tons compare with 9200 tons a week ago. Sizable new inquiries include 500 tons at Duquesne, Pa., for an electric furnace building for Carnegie-Illinois Steel Corp. and 1400 tons at Canton, Ohio, for an extension to Republic Steel Corp.'s electric furnace department. Reinforcing steel awards for the week total 13,850 tons, including 3855 tons for Great Britain under lend-lease agreement. Among new reinforcing steel projects of 3700 tons, the only inquiry of size is 1000 tons for two batteries at an East Coast fort.

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Precision, smooth finish, uniformity are the prime qualities you insist on in cold drawn steel bars. Our first responsibility to all our customers is to maintain these qualities.

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AMERICAN IRON AND STEEL WORKS • PITTSBURGH, PENNSYLVANIA

News of Industry

Photo by Wide-World

ANTI-AIRCRAFT SEARCHLIGHTS: Five 60-in. anti-aircraft searchlights have been installed at the new Navy ordnance building at General Electric Co.'s plant at Schenectady.

Dissatisfaction Over Defense Inequalities Grows at Cleveland

Cleveland

• • • **The rising volume** of complaints at inequities in the defense program prompted THE IRON AGE to make "a defense complaint round-up" in this area to see if any suggestions were forthcoming from non-defense groups fearful for the continued existence of their businesses and of the spectre of wide-open inflation. The results yielded a bumper crop of mutterings about "defense wages being too high," strikes on defense projects, allegations of "chiseling on priority ratings" and "inequitable distribution of defense contracts."

The most frequent complaint encountered was that of the skyrocketing wages for defense workers, which attract skilled help long loyal to non-defense plants and make it almost impossible for little businesses to secure and retain help for any length of time. A screw manufacturer told THE IRON AGE, "Two of our tool men, who had been with us for many years, left us a few weeks ago to go to work for a 'defense boom' plant at the rate of $1.50 an hour. We were paying $1.12½ an hour, with 24 hrs. overtime weekly assured during the present emergency." A tile contractor is getting desperate about the number of apprentices he has been training for tile-setting at salaries of from $6 to $10 per day during training, only to lose these men to defense plants after spending valuable time and money to train them. He bitterly observes, "The NLRB bunch don't realize how they're disrupting small businesses like mine by allowing pay increases here and there, which we can't possibly match without raising our prices. Mr. Henderson claims he wants to keep prices down!"

Superintendents of Cleveland buildings are having their hands full steadily training new elevator operators to replace those lost to defense industries. One told THE IRON AGE, "We thought the 'draft' was going to take some of our men. But that was no comparison to what this national defense thing is doing to us. I suppose we could compete by paying elevator operators $60 per week."

Cleveland parking lots have been losing help so repeatedly that they have been literally forced to increase parking charges from 40 to 60 per cent in order to make possible the payment of higher wages to their employees and reduce the number of resignations. The owner of one lot told THE IRON AGE that rising salaries for defense workers "were shaking the economic structure of the entire nation, since non-defense employers were being forced to pay matching salaries to retain help and continue operations."

The owner of a small metalworking company said, "Washington orders a curtailment of 50 per cent in automobile output, but how many parts manufacturers can operate profitably at a 50 per cent of capacity rate? We can lose less money by shutting down completely, and get fewer gray hairs about it, too. After all, we are not doing defense work, and Washington has not given us any, while other plants have had twice as much as they could take care of. So while those fellows are building new plants, a lot of the rest of us are going to find our factories gathering dust."

The owner of a small foundry with few defense orders wonders where all the pig iron has been going. "After all," he stated, "the most wild-eyed estimates indicate that somewhere around 40 to 50 per cent of all the iron being produced is going into defense. Well, where is the rest of it going, if practically all shipments are to users with high ratings? I don't have a high rating, but thanks to my foresight the fair-sized inventory I put in some months ago has tided me over. Meanwhile, consumers with no foresight but high ratings are getting their requirements. What I'm worried about is what my treatment will be when my inventory is gone. I would feel a lot surer of my position if I knew that Washington was going to make a careful check into these ratings and the inventories reported to Washington."

A newspaperman laughed when asked his ideas on public reaction to the defense picture. "Washington's actions are at cross-purposes, and I think the average man is apathetic to the defense drive because he can't fathom how Knudsen calls for swifter and longer hours on defense work, while the National Labor Relations Board seems to be placing the accent on longer and longer strikes. As long as strikes are permitted on defense work, the public will still regard the whole defense drive as something far away, like relief for China."

A representative of a company

with defense orders which recently was paralyzed for several weeks by a strike said, "The strike wasn't necessary at all. The employees and we knew all along that the NLRB would give them whatever they wanted, but I suppose the union officials had to assert their authority or something of the sort. The men were called off their jobs while negotiations were underway. All of which seems to indicate beautiful control of labor by Washington."

An executive in a company manufacturing steel parts for non-defense uses observed: "Washington says that it is cutting down the production of this or that item to 40 or 50 per cent. But then, federal officials do not go on to say how these people are going to get that particular percentage of steel and other metal items they will need. It might have been just as effective for Washington to merely ignore non-defense industries, since we won't be able to get the materials we need with priorities snarled up so badly."

The few persons interviewed who apologetically said that federal authorities "were doing the best they could," followed up that observation with criticisms of things which had not been done at all or not been done very well.

Priorities Aid for Small Firms Seen by Congressman

Indianapolis

• • • **Rep. Charles A. Halleck** (R. Ind.) told the Indiana Motor Truck Association that priority officials have taken cognizance of small business problems and have promised to make "drastic changes" in the priorities system to help the small manufacturer stay in business.

OPM Contract Service Opens 5 New Offices

Washington

• • • **OPM's new** contract distribution division has opened offices in five additional cities in an effort to help qualified manufacturers obtain defense work. The new offices are in Albany, N. Y.; Portland, Maine; Rochester, N. Y.; Spokane, Wash., and Springfield, Mass.

U. S. Steel Shipments Set September Record

• • • Shipments of finished steel products by subsidiary companies of U. S. Steel Corp. reached 1,664,227 net tons in September, the highest September total on record. This brings the total for the first nine months of 1941 to 15,137,436 tons, also a record, surpassing the previous high of 13,450,298 tons for the first nine months of 1929. The previous September high was 1,421,625 tons, in 1920.

The September shipments showed a decrease of 89,438 tons from the August, 1941, figure, and an increase of 271,389 tons over the September, 1940, figure. The nine months' total represented an increase of 4,703,709 net tons over the comparable 1940 figure.

Evansville Industry Gets OPM Help On Unemployment

Washington

• • • **Evansville, Ind.,** was earmarked by OPM last week for special consideration from the War Department in receiving defense contracts to cushion the shock of severe "priorities unemployment." Specifically, OPM's contract distribution service recommended a remedial program for Servel, Inc.; Sunbeam Electric Mfg. Co.; Briggs Industrial Corp.; the Chrysler Corp., and 11 other companies.

OPM's labor division investigated 22 plants in Evansville, found that employment on defense work was negligible, and reported that largely as a result of priorities and diversion of scarce materials employment had dropped from 10,953 employees in July this year to 9766 by September, with 427 on defense work, or a net displacement of nearly 1200 workers.

In addition to specific suggestions to the War Department for contracts the OPM urged operating heads of companies with both Detroit and Evansville plants to divert work to Evansville rather than to extend Detroit activities, and assigned a representative from the defense contract service in St. Louis to work closely with the secretary of the Evansville Manufacturers & Employers Assn.

Milwaukee Prime Contractors Farm Out 10 to 30% of Work

Milwaukee

• • • **A survey of** subcontracting and indirect defense work in this locality indicates that about $80,000,000 worth of such orders have been distributed, some of them outside of the state, because local shops are crowded. Several companies have men devoting their entire time to scouting for subcontractors. Large firms farming out defense work include:

Kearney & Trecker, which has let about 30 per cent to some 90 firms; Allis-Chalmers Mfg. Co., which has let 10 to 15 per cent to 180 firms, some outside of the state, amounting to about $1,000,000 worth, in eight months; Oilgear Co., which has farmed out 30 per cent to 30 to 40 plants employing from 3 men to 5000, and is looking for more plants that can do high precision work, .0001 in. in some cases; Filer & Stowell, which has let about 10 per cent; Nordberg Mfg. Co., which has given subcontracts, entailing gear cutting and tool and jig work, to about 60 firms, and is looking for more high precision equipment; Cutler-Hammer Co., which has about 45 firms doing work; and Ampco Metal, Inc., which currently has farmed out about 10 per cent to a dozen firms.

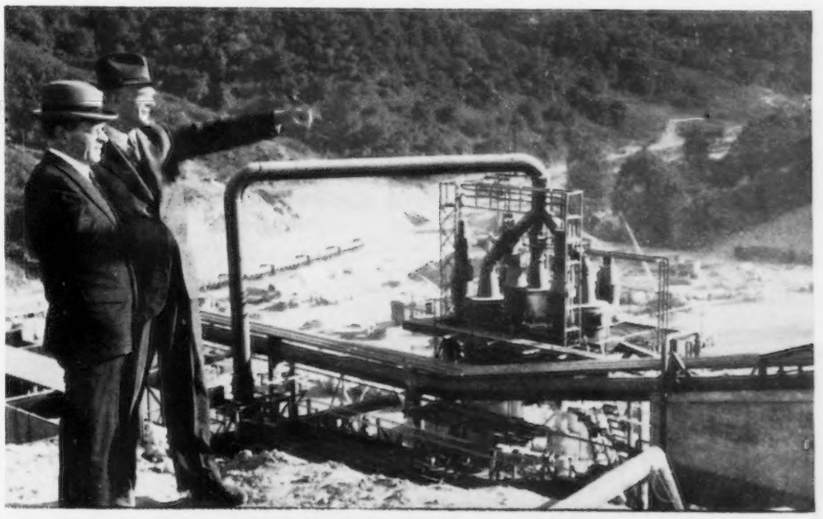
OPM Iron Allocations Worry Cincinnati Melters

Cincinnati

• • • **Foundrymen in** this area are beginning to be disturbed over the pig iron situation. While there has been no serious dislocation at the present time, OPM parceling out of available iron is not filling up the dwindling inventories of local melters. The scrap situation, however, tends to get tighter.

National Can Negotiating For Aliquippa Plant Site

• • • **National Can Corp.,** formerly McKeesport Tin Plate Corp., is negotiating with the Pittsburgh & Lake Erie Railroad for a can making plant site at Aliquippa, Pa. The company is also said to have plans for plants at Chicago and Philadelphia.



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MORE MAGNESIUM: Built to widen one of the most dangerous defense bottlenecks—a shortage of magnesium—this Permanente, Cal., plant, designed to produce magnesium by using hydrogen as a reducing agent, is expected by next March to turn out 12,000 tons a year, or twice as much as was produced in the U. S. in 1940. Dr. Fritz Hangirg, Austrian inventor of the process, appears in the second photo from the top (left) with Henry J. Kaiser, West Coast industrialist (center), and Sidney Hillman, OPM co-director. The top photo shows the Permanente plant, which uses ore from Nevada, coke from Los Angeles, natural gas from Southern California, and electric power from the high Sierras. Below are interior views, the photo at the right showing a giant retort for refining magnesium.

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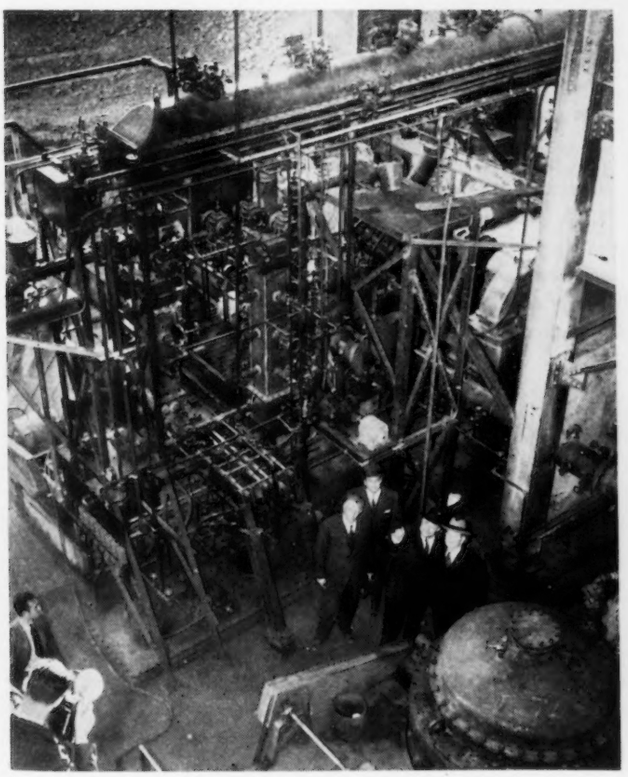
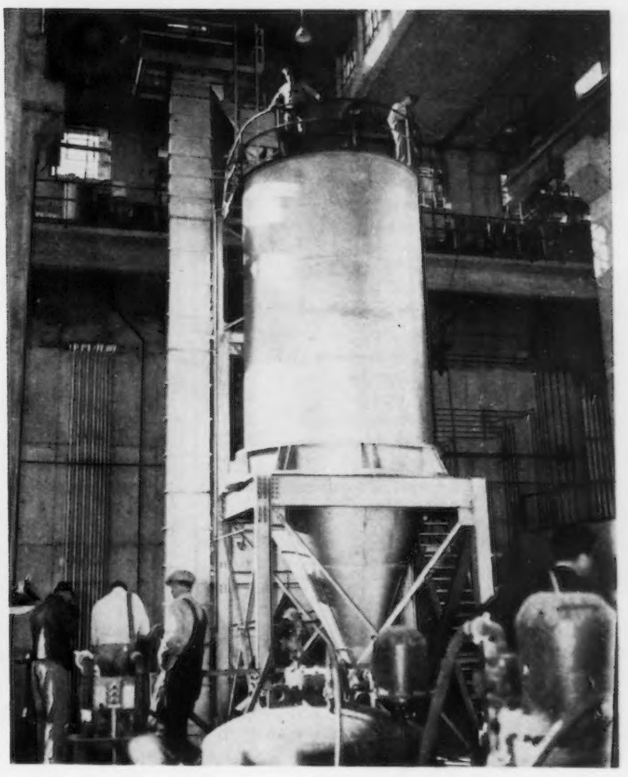




Forms and Methods

Form Number	Subject	Method of Extending
PD-1	Application	A
PD-2	Civilian Rating	A
PD-3	Army-Navy Rating	B
PD-4	Govt. Rating other than Army-Navy	B
PD-5	Foreign Govt. Rating	C

Preference Rating Order No.	Product	Method of Extending
P-3	Airframes	G
P-4	Aircraft Engines and Props.	G
P-5-a	Cranes, Hoists	E
P-6	Defense Supplies	F
P-6-a	Civil Aircraft Parts (self assigned)	
P-7	Merchant Ships	D
P-8	Freight Cars	D
P-9-a	Airframes, Heavy Bomber	G
P-9-b	Engines, Heavy Bomber	G
P-9-c	Props., Heavy Bomber	G
P-9-d	Gun Turrets, Heavy Bomber	G
P-9-e	Sights, Fire Controls, Heavy Bomber	G
P-9-f	Turbo Superchargers, Heavy Bomber	G
P-11-a	Metal Working Equip.	H
P-12	Aluminum Scrap	E*
P-13	Airframes	G
P-14-a	Ship Ways	D
P-14-b	Ship Ways	D
P-15	Elec. Relays and Solenoid Assemblies	G
P-16	Radio Equipment	G
P-17	Canning Machinery	F
P-18-a	Cutting Tools	F
P-19		
P-19-a	Defense Construction	F
P-19-b		
P-20	New Locomotives	F
P-21	Locomotive Repair	F
P-22	Repairs Plan	K
P-23	Mining Machinery	D
P-24	Exp. Research Labs	G
P-25-a	Light tank parts	F
P-25-b	Spare tank parts	F
P-25-c	Tank guns	F
P-25-d	Tank engines	F
P-25-e	Light Tank parts	F
P-26-a	Medium Tank parts	F
P-26-b	Spare tank parts	F
P-26-c	Tank guns	F
P-26-d	Tank engines	F
P-26-e	Medium Tank parts	F
P-29	Health Supplies	F
P-31	Foundry Equipment	F
P-32	Farm Machy. Repair	F
P-33	New Farm Machinery	F
P-39	Arc, Resistance Welding Machinery	F
P-42	Canning Machinery	F
P-43	Research Lab. Supplies	F
P-46	Utilities Supplies	I
P-47	Air Transport. Maint.	F
P-52	Aircraft Accessories	F
P-53	Textile Machinery Maint.	F
P-54	Defense Trucks, Trailers, Pass. Carriers	J
P-55	Defense Housing	**
P-56	Mine Repairs	L
P-57	Auto Parts, Replace	J

How Industry Can Extend Preference Rating Or

Method A

In effect, OPM at present has eliminated the PD-2 and is returning to the applicant the original PD-1 application form stamped with Mr. Nelson's facsimile signature. When thus returned, PD-1 to all intents and purposes becomes the same as a PD-2 which used to be issued. Applicant then sends the approved and stamped PD-1 to his supplier. If the sub-contractor or supplier wishes to extend this certificate to his sub-contractor or supplier, the same procedure applies as existed when the PD-2 was used; that is, he reapplies on another PD-1 application form.

Method B

Blank copies of these certificates should be obtained from the branch of the service or government originating the certificate, which should then be filled in and certified on the back in the space provided in the left hand side. This signed set should then be taken or sent to the nearest branch of the service or government originating the certificate for certification by the procurement officer, inspector or authenticating officer. When taking or sending such certificate for authentication, the original certificate received should be taken or sent also in order that the procurement officer may identify to his satisfaction the extension which he is being asked to authenticate.

Method C

PD-5 is extended in the same way as PD-3 and PD-4, except that there is required on the back an additional counter-signature of the government official representing the various governments from which the original PD-5 was issued.

Method D

On one of the blank copies, execute the acknowledgment ("the undersigned acknowledges receipt of . . .") and send this to the Priorities Division, OPM, Washington. Do not execute the certification. On another blank copy, execute the certification (leaving the acknowledgment blank) and forward this together with your order to the sub-contractor or supplier. Such executed copy is the extension.

Method E

Execute and have notarized the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. On another copy execute the acknowledgment and forward with the order to sub-contractor or supplier.

*P-12 can be extended only to the person from whom the smelter purchases the scrap. Follow instructions for Method E except that it is applicable only to the supplier. The acceptance must be notarized.

Method F

Execute the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. On another copy execute the acknowledgment and forward with the order to sub-contractor or supplier. (Same as Method E except that no notarization is needed.)

Method G

Execute the acknowledgment and forward one copy to the Priorities Division, OPM, Washington. Execute the certification on another copy and have the certification also authenticated by the Officer or Inspector located at the plant of the issuing "producer."

** Consult order p-55.

Orders and Priority Certificates to Suppliers

Method H

Execute the acceptance and send to the Priorities Division, OPM, Washington. Execute the affidavit, filling in lines 15 and 16 with the name of the customer who sent the acceptance to you.

Method I

Insert in the space provided, classification of the "producer." Execute in the spaces provided and send one copy to the Power Branch, OPM, Washington. Do the same with another copy except that this copy should be retained for file. In order to extend this rating from "producer" to supplier or from supplier to sub-supplier, such "producer" or supplier must endorse the following statement on the original and all copies of each purchase order or contract for materials, the delivery of which is entitled to the preference rating: "Purchase Order for Utilities Operation, Maintenance and Repair, Preference Rating A-10, pursuant to Preference Rating Order No. P-46" (Authorized Signature) and deliver the original or a copy thereof to the seller of such material.

Method J

Order for material is endorsed by producer and supplier as follows: "An (A-3; A-10) preference rating is assigned to this purchase order pursuant to Limited Preference Rating Order No. (P-54; P-57). This application of rating is made by the (supplier; producer) upon the conditions set forth on said order, with which we are familiar.

—(Authorized signature of producer or supplier)."

Note: P-54 assigns A-3 rating; P-57 assigns A-10 rating.

Method K

A producer in order to apply the preference rating to a delivery of material to him must endorse the following statement on the original and all copies of the purchase order or contract for such material signed by a responsible official: "Purchase order for repair or emergency inventory—Preference rating A-10 under Preference Rating Order P-22." A supplier in order to apply the preference rating to a delivery of material to him must endorse the following statement on the original and all copies of the purchase order or contract for such material signed by a responsible official duly designated for such purpose: "Purchase order for material to fill a duly rated order for repair or emergency inventory. This purchase order bears Preference Rating A-10 under Preference Rating Order P-22."

Method L

In order to apply the A-1 rating, send a statement to the OPM at Washington describing the material and the nature of the emergency. OPM will certify the application, which is to be passed on to the supplier.

To extend the A-8 priority endorse as follows: "Purchase order for material for a mine rating pursuant to Preference Rating Order P-56 Mine Serial No. . . . ., Rating A-8. This application is made pursuant to the terms and conditions of that order with which the undersigned is familiar.

—Authorized Signature."

• • •

EDITOR'S NOTE: Each Preference Rating Order contains full instructions for applying the rating for delivery of material, and the order should be consulted whenever questions arise.

THE IRON AGE

Priorities Questions

(Answers to other questions on priorities appeared in THE IRON AGE, *editions of Sept. 25 and Oct. 2)*

● *When extended to a steel producer must Army and Navy priority certificates show the item being ordered in addition to the dollar volume of the order?*

—Steel company, Pittsburgh.

A certificate issued by Army or Navy officials covers items on the critical list. Item needs to be named.

Can an A-10 preference rating assigned on defense supplies rating order P-6 be used to obtain materials other than those scarce materials reported on Form PD-25?

—Pittsburgh manufacturer

No.

Will the A-10 rating given to steel mills for maintenance and repair be high enough to secure copper allocations since it is so widely used?

If not, apply on PD-1, says OPM.

Are general preference orders P-20 and P-23, covering locomotives and mining machinery still in use and if so do they carry A-3 preference rating?

—Wilkes-Barre foundry.

Yes. They carry A-3.

Some producers of gray iron castings are requiring the consumer to file PD-73. Is any classification of gray iron castings shown on Form PD-73?

—Cleveland foundry.

Only carbon and alloy steel castings are covered by PD-73.

How do I go about getting a priority extension in order to purchase steel for sub-contract work for the government?

—Defiance, Ohio, manufacturer.

Consult with prime contractor or government agency regarding Preference Rating Order and obtain copy of order, which will show method of extending to obtain materials. See chart in adjoining columns.

Non-Defense Building Is Limited by SPAB To Conserve Material

Washington

• • • **The Supply Priorities** and Allocations Board, acting to hold down steel in non-defense construction to less than 3,000,000 tons in 1942, last week ruled that builders of public or private construction projects using critical defense materials cannot expect priority aid from the government unless it is shown that the projects are "either necessary for direct national defense or are essential to public health and safety."

Since there was nothing in the order that could be interpreted as an out-and-out prohibition against non-defense construction by companies in possession of sufficient materials to start new jobs, some observers were frankly mystified as to why the order, issued in the form of a SPAB policy statement, was made at this time. It injects no new change in a situation which has obtained for several weeks, and some preferred to think of the action as an effort to further dramatize the effects of an all-out defense effort.

Still others thought that the statement was intended to serve notice on Congress that SPAB looked with disfavor upon non-defense public works projects being considered on Capitol Hill in conjunction with the pending rivers and harbors bill, traditionally a starting point for many pork-barrel projects.

In any event, SPAB estimated that the 1941 construction program will use about 13,800,000 tons of steel ingots—or about 1/6 of the year's total consumption—that of this amount 6,300,000 tons are being used for non-defense construction. Basing its figures on the assumption that industrial and public buildings are the chief source of demand for steel in non-defense construction, SPAB conceded that, even though the steel to be consumed by non-defense construction can be held to less than 3,000,000 tons next year, the saving will be partially offset because defense construction in 1942 will require an estimated 1,200,000 tons over and above the amount used in defense construction this year.

SPAB explained that its new curtailment order would apply to public projects—federal, state, and local—roads and highway; river and harbor improvements; flood control and power projects; industrial plants, lofts, warehouses; office buildings and other commercial construction; residential construction and the construction of public utilities.

The announced policy, which means in effect that no future construction job can share in critical defense materials unless the project is absolutely necessary, will be administered by subjecting all proposed building projects to these tests:

1. Does this construction involve the use of appreciable quantities of critical materials?

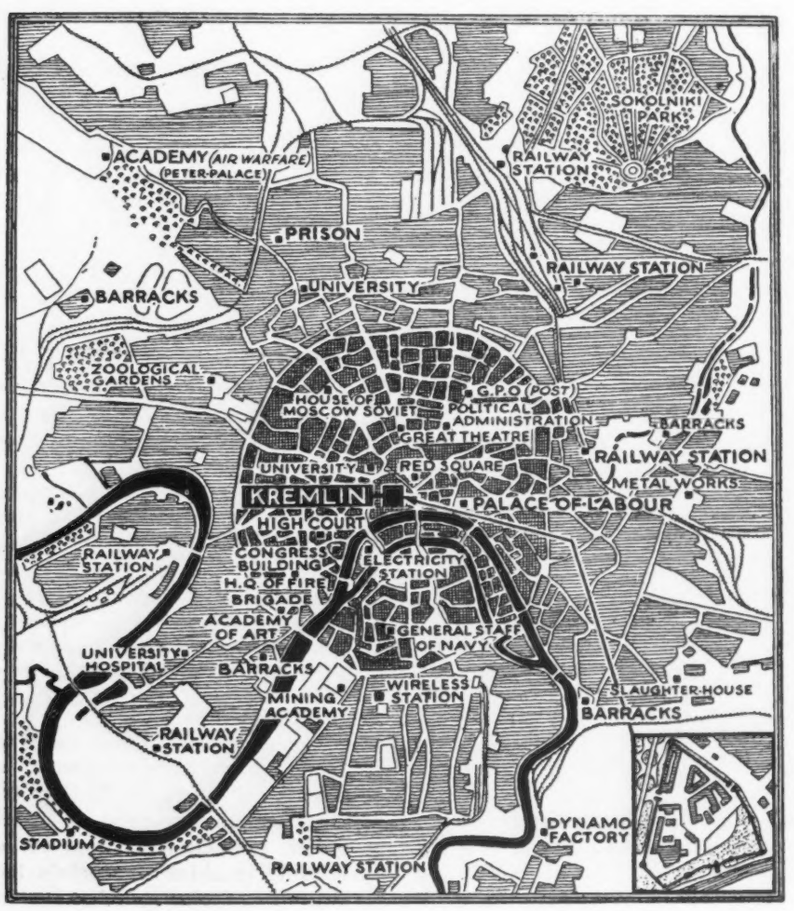
2. Is the construction directly necessary for national defense, or clearly essential for the health and safety of the civilian population?

Of an estimated $11,000,000,000 worth of total construction for 1941, SPAB said that about $4,900,000,000 would be spent on defense construction, $6,300,000,000 for non-defense construction. It broke the figures down this way:

DEFENSE CONSTRUCTION	
Military construction	$1,800,000,000
Industrial facilities	1,700,000,000
Defense housing	1,200,000,000
Defense highways	200,000,000

NON-DEFENSE CONSTRUCTION	
Residential construction	$1,800,000,000
Industrial construction	500,000,000
Public works	1,500,000,000
Commercial building	900,000,000
Public buildings	400,000,000
Privately financed utilities	700,000,000
Farm construction	500,000,000

MAP OF MOSCOW: This map of Moscow, which the Germans reported as certain to be captured within a short time, is shown as it appeared in a German newspaper. In the Kremlin, American and British aid missions discussed ways and means of getting tanks, planes, and other war materials to the beleagured Soviet.



Flood of Priority Ratings Confuses Steel Scheduling

Pittsburgh

• • • **With definite indications** from Washington that more and more outright allocating of steel orders will be resorted to in lieu of increasing the number of priority ratings, attention has been focused recently on the difficult distributing problems being faced by the large integrated steel mills.

The fact that so many priority ratings in the higher brackets have been issued during the past several months, it is believed, has contributed much towards the creation of intricate steel mill schedule problems which has made the equitable distribution of available supplies an almost impossible task. Coupled with this fact is the information not generally known that most large steel mills have always had more finishing capacity than steel ingot capacity in order to have a greater flexibility during normal times.

With finishing mill capacity in such departments as plates and shapes fully engaged, it is obvious that a greater than normal proportion of available raw steel has gone to these departments, thus making less available for other steel products. Likewise, with other steel products also carrying priority ratings, for the time being at least, less steel becomes available for non-rated orders in various product departments. Hence the matter of steel shortages, as far as some essential and non-essential civilian consumers are required, resolves itself into a situation where time is the controlling element rather than capacity.

Tin plate mills, while the least affected so far on the basis of curtailment in operations, have come under the classification of urgent necessity because of the importance attached to food packing in the present emergency. Close to 32,000 tons of tin plate a month is going out of the country on lend-lease activity while the government has in the past few weeks notified some food processors, especially packers of canned milk, that governmental requirements will be much heavier than at first thought. Millions of cans of beer are going abroad to Africa where it has been found this beverage

RIDDLESBURG STACK MELTS AGAIN: When the Riddlesburg Coal & Iron Co. recently lighted its rehabilitated blast furnace at Riddlesburg, Pa., scores of friends from nearby communities turned out. The furnace employs 325 men and will produce about 6000 tons of iron a month. The stack formerly was owned by the Colonial Iron Co.

o o o

ORE FLOW BLOCKED: Here is the railroad bridge at Sault Ste. Marie, Mich., which collapsed Oct. 7, sending switch engine and two freight cars into the channel, and causing a 4-day shutdown of the Soo Canal through which vital iron ore shipments are made. The shutdown indicates the necessity for rebuilding the now unused Weitzel Lock, Ralph Budd, National Defense Commissioner of Transportation, said after the bridge collapse. If the Weitzel lock had been usable, ore and coal traffic on the shipway would not have been halted. The blockade may have caused a loss of about 750,000 gross tons to this season's iron ore movement, although re-scheduling of the ore carriers' trips may be able to make up most of the time loss. However, the October movement may fall to about 9,500,000 gross tons due to the delay, as against the 10,061,127 gross tons of October, 1940.

provides not only a special food value but a moral stabilizer as well and the same condition prevails for U. S. Army cantonments.

Food demands by the British are said to be rising rapidly and taking these with the domestic food requirements, it is already indicated that tin plate demand for essential food packing over the next year will reach record-breaking heights. This, of course, means that small and non-essential users of tin plate who cannot come under the classification of food processing, may find it difficult or impossible to obtain anywhere near their requirements over the next several months.

The nation's plate mills for several months have been working entirely on rated tonnage and the majority of the latter has been in the higher brackets, such as A-1-a, A-1-b, and A-1-c. These higher ratings piled up with such rapidity that freight car builders with an A-3 rating obtained only partial proportions of their requirements. This latter condition became so complex that the OPM was forced to allow steel mills to place car tonnage on order books despite the heavier volume of higher ratings. There seems little chance that non-defense plate needs, unless they come under a classification of serious essential civilian requirements, will be filled for some time to come.

Among the bar units in the country, a paradox exists with plenty of finishing capacity but a lack of raw steel. In many integrated steel mills, bar mills are operating somewhat below capacity for one or all of the following reasons: Lease-lend exports are taking away raw material in the form of billets; other product departments with higher preference ratings are syphoning off raw steel; a tremendous increase in A-1-a and A-1-b reinforcing concrete orders has blocked production of hot rolled bars; and finally, the ever-increasing amount of hot rolled bar specifications carrying preference ratings and slated for ammunition and other uses has created a situation which has become almost as tight as the plate picture.

Even pipe mill departments in the large integrated mills are feeling the effect of priorities and it is estimated that between 40 and 50 per cent of pipe products carry a definite rating, among which are boiler tubes, mechanical tubing, standard pipe, and to some extent line pipe. Even though this leaves a fair proportion of unfilled pipe specifications unrated, this does not mean that pipe mills can fill these orders, for the simple reason that the rated business must be filled first and pipe mills are continually subject to having steel taken away from them and sent to other departments where ratings are higher or urgency of delivery is greater.

Republic Aviation Completes $6 Million Plant Addition

Completion of the new $6,000,000 addition to the pursuit aircraft plant of the Republic Aviation Corp., East Farmingdale, L. I., was announced last week. The first completed airplane had already rolled off the assembly line.

52 of 396 Plant Expansions Financed by Public Funds

Washington

• • • **The latest tabulation** prepared by OPM's bureau of research and statistics on the expansion of facilities for producing iron and steel products shows that out of a total of 396 plant expansion projects costing $505,153,000 there are 52 plants to cost $332,190,000 which are being financed by public funds. On the other hand, 344 plants to cost an estimated $172,963,000 were listed as privately financed.

The iron and steel classification was tabulated with 12 other industrial groups in an OPM report indicating that 2756 defense industrial plant expansions approved through Aug. 31 totaled $4,725,786,000. This represented approval of certificates during August covering an estimated $433,291,000 of new facilities, an increase of 13 per cent over the July 31 figure.

Priorities Enable Gary School To Double Trainee Attendance

Gary, Ind.

• • • **Vocational school** here is getting something many industrial firms cannot obtain—a boring mill to be delivered Oct. 25. With $90,000 worth of machine tools on order for many months, deliveries had not been coming through until priorities were recently granted. New equipment will enable the overcrowded school almost to double the number of trainees.

ALLEGHENY-LUDLUM INSPECTION: A 4-high rolling mill at West Leechburg, Pa., and an addition to the electric furnace department at its Brackenridge, Pa., plant were placed into operation recently by Allegheny-Ludlum Steel Corp., Pittsburgh. They are (left to right), M. C. Harris, district manager of Pittsburgh area plants; L. W. Hicks; E. J. Hanley, secretary and treasurer; A. E. Braun, W. F. Detwiler, chairman of the board; A. F. Dohn; H. G. Batcheller, president; W. C. Kirkpatrick and V. B. Browne, vice-president in charge of research.

Figures Show Illinois Arms Facilities Only Partly Used

Chicago

• • • **Illinois manufacturers,** complaining that not enough productive facilities are being used for defense, state that aggregate proposals frequently exceed by many times the amount of material sought by the government. The following examples are cited:

Out of 5000 20 mm. cartridge cases allotted to Illinois, 17 bidders submitted prices for a total of 121,000,000 cases. An order for M31 fuses amounting to 1,700,000 units brought bids from five firms for 9,000,000. An order that was never placed sought 4,200,000 fuses and eight companies announced they could turn out 8,200,000 units. A requisition for 1,850,000 M48 fuses resulted in bids for 6,500,000 from five companies. Eight companies showed they could build 13,250,000 boosters when only 1,740,000 were required. On a requisition of 2,000,000 anti-tank mines, eight Illinois firms bid on four times the amount requested.

New Contract Offices Open in New York State

• • • **Two new offices** of the Division of Contract Distribution have been opened in New York state at Albany and Rochester, according to W. O. Crabtree, district manager, 33 Liberty Street, New York. The Albany office is at the State Bank Building, 75 State Street, Albany, and is headed by Charles H. Adler. The Rochester office is at the Chamber of Commerce Building, 55 St. Paul's Street, Rochester, and is headed by Robert Schwarting.

Five other offices recently opened are: Columbus, Ohio, 305 Spahr Building, 50 East Broad Street; Indianapolis, Circle Tower Building; Hartford, Conn., Phoenix Bank Bldg., 805 Main Street; Providence, R. I., Industrial Trust Bldg., Westminster Street; Louisville, Ky., 200 Todd Building, 4th and Market Streets.

Mr. Crabtree reported steady progress by the New York office in effecting contracts. In September, 134 were completed through the assistance of the service. This is exclusive of the National Defense Production Clinic in New York.

"E" FOR BALDWIN: Recently the Navy Department added the Baldwin Locomotive Works' Standard Steel Works Division, Burnham, Pa., to the plants awarded the Navy "E" pennant and Bureau of Ordnance flag for exceptional work in defense production. From left to right, above, are Charles E. Brinley, president Baldwin Locomotive; Edwin T. Thomas, works manager; John McCurry, Sr., and Bernard T. Shields, veteran Baldwin employees.

New S. African Steel Plant Will Supply Domestic Needs

Washington

• • • **Domestic output** of iron and steel products in South Africa is to be sharply expanded, a report to the Department of Commerce shows. The South African Iron & Steel Industrial Corp. (Icor) recently began the construction of a £10,000,000 steel plant including blast furnaces, coke ovens and rolling mills, at Vereeniging, about 36 miles south of Johannesburg. The plate mill, with annual capacity of 100,000 tons, will be the first unit erected. At the start, steel will be brought from Icor's works at Pretoria, where the annual ingot output now is about 600,000 tons. Employment will be given to approximately 10,000 men.

The anticipated annual output is placed at 1,000,000 tons, which, combined with present production at Pretoria, should meet South Africa's normal requirements.

U. S. Steel Builds Five Ore Vessels, Largest on Lakes

• • • **Five new ore freighters,** to be the largest on the Great Lakes, are now under construction for the Pittsburgh Steamship Co. The freighters, which will be launched early next year, will have a combined maximum single cargo capacity of 87,500 tons of ore.

Aluminum Co. Cleared In Anti-Trust Suit

• • • **Federal Judge Caffey** at New York last week cleared the Aluminum Co. of America of charges of maintaining an illegal monopoly in the aluminum industry and ruled that no conspiracy existed between the company and any of its co-defendants during the past 25 years. The court also upheld the propriety of the establishment of Aluminum, Ltd., in 1928.

It required most of the week for the court to render the decisions. The government, in an action begun in April, 1937, was seeking an order dissolving Aluminum Co. in its present form and the setting up of several competing sections of the organization. The trial began in 1938 and testimony continued intermittently until August, 1940.

Priorities for Lift Trucks

• • • **An A-1-g preference** rating to permit manufacturers of power-driven industrial lift trucks to secure certain essential supplies, including iron or steel castings, steel forgings, bars, sheets, plates and shapes, was granted on Tuesday by OPM. Lift truck manufacturers may apply the rating only to deliveries of materials to be used in filling defense orders, the priorities division explained. Commercial motor trucks are specifically excluded from the terms of the order.

SWOC Presses for Showdown; Strike Threatens Tanks

• • • **Labor questions** were jeopardizing the national defense program again early this week. The SWOC appeared to be pressing toward a showdown on the closed shop issue in the steel industry, particularly in the Chicago area. A small strike in Hillsdale, Mich., was threatening to halt production of Army tanks and was viewed by the War Department as one of the most serious disputes yet encountered.

According to a statement given THE IRON AGE at Chicago by a high ranking SWOC official, there will be a tieup of steel production soon if the union does not gain the closed shop. Recently huge losses in production have occurred at Chicago as the result of disputes, including 40,000 tons of steel ingots, approximately 25,000 tons of pig iron and 30,000 tons of rolled steel irrevocably lost by the Gary, Ind., mills of Carnegie-Illinois Steel Corp. from Oct. 2 to 11.

Chicago's labor pot has been boiling for two months with a constant succession of daily stoppages, slowdowns, or grievance arguments which started in the plants of "Little Steel" as a show of strength preliminary to contract negotiations with those producers. But when the lid blew off, it was three subsidiary plants of the United States Steel Corp., already a party to a union contract, that were affected most seriously. Chicago's operating rate for the week of Oct. 5-11 shot down to 93 per cent, lowest point in 1941.

On Oct. 11 a complete shutdown of the Carnegie-Illinois tin mill occurred. The action followed the closing of the sorting department where non-CIO girls were working. The biggest blow of the hectic month came the next day when six blast furnaces at the Carnegie-Illinois South works in Chicago were closed.

"We are strong enough to take what we want," the delegates of the 52 SWOC lodges in this district were told by Van A. Bittner, regional director for the western area, during the first week of disturbances. Bittner, one of the highest ranking officers in the national organization, said the SWOC now can and will take the union shop without waiting for "steel corporations to hand it to us" and that the demand for check-off and closed shop would be made.

The union leader's comments on defense were: "There are two great defense programs—the government's and ours. If a union cannot defend itself it cannot defend the country. Our goal is that all steel be made by members of SWOC."

All locals in the Chicago-Gary-Calumet district are united in their resolve to get the closed shop. In fact, THE IRON AGE has learned that many members have responded to a union drive and already sent in to the company slips authorizing and requesting the company to check-off dues from payrolls.

There is evidence that the Chicago district is only the "guinea pig" in this union drive. A national closed shop is the ultimate aim.

In the Hillsdale, Mich., dispute between the AFL and CIO, Federal mediators were proposing that an umpire be accepted.

Clifford Stilwell Heads Tool Builders

Chicago

• • • Clifford S. Stilwell, executive vice-president, Warner & Swasey Co., Cleveland, was elected president of the National Machine Tool Builders' Association in convention here this week. He succeeds Frederick V. Geier.

Other officers elected were: first vice-president, George H. Johnson, president, Gisholt Machine Co., Madison, Wis.; second vice-president, John S. Chafee, vice-president, Brown & Sharpe Mfg. Co., Providence; Treasurer, E. C. Bullard, vice-president, Bullard Co., Bridgeport.

New directors elected for a three-year term were Mr. Chafee; E. B. Gleason, vice-president of the Gleason Works, Rochester, N. Y. and Albert H. Eggers, sales manager, Greenlee Bros. & Co., Rockford, Ill. Mrs. Frida F. Selbert will continue as secretary and Tell Berna as general manager. Richard H. Abbott has been named assistant to Mr. Berna.

Shipments Rising for Machine Tools, Convention Told

Chicago

• • • **Machine tool** shipments for September totaled $68,653,000 compared to shipments of $64,300,000 in August and $42,321,000 in September, 1940. Frederick V. Geier, president of the National Machine Tool Builders' Association and president of the Cincinnati Milling Machine Co., told members of the association in the opening address of the convention here Oct. 13 and 14.

Discussing employment increases, Mr. Geier said that in September, 1940, 110 firms in the industry were accounting for 90 per cent of the industry's employment and had 44,000 men on their rolls. This number had increased to 68,000 and last month to 92,000 with over 12,000 men in training.

Commenting upon the National Industrial Conference Board's report that the average hours worked in machine tool shops are the highest of any American industry, Mr. Geier said that 99.12 per cent of the employees in the industry are in plants operating on a two or three shift basis. By last month 53 per cent of all employees in the industry were on a three-shift basis. Eighty-seven per cent of the plants are working over 100 hr. and up to 168 hr. per week.

Mr. Geier reported a great increase in the amount of work subcontracted during the past year, with 89 firms now sub-contracting parts, units or complete machines in an amount exceeding 25,000,000 man-hr. a year and 56 kinds of machine tools completely sub-contracted by 26 machine tool companies.

"The increase in capacity of existing plants and the widespread sub-contracting by members of the industry," Mr. Geier stated, "has been supplemented by the output of a variety of new sources. For all types of machine tools there are at least 72 new machine tool producing sources other than the subcontracting sources previously mentioned."

Wendell E. Whipp reported that a letter ballot had indicated a majority of the membership in favor of adopting a new and lighter color standard in place of the present machine tool gray.

Warehouse Status Clarified by OPM

Washington

• • • **Contrary to** the statement published in THE IRON AGE of Oct. 9, page 173, steel warehouses never have been given a priority rating higher than A-9 assigned in the order of Sept. 4. If a jobber or warehouse had a higher rating it was issued on a particular order from a particular customer. Hence, it was incorrect that, as THE IRON AGE had been told at OPM, to say that a steel warehouse could get material over and above the A-9 rating. There is no A-7 rating for steel warehouses.

The correct priority status of steel warehouses was explained to THE IRON AGE on Tuesday by J. R. Stuart, OPM iron and steel branch. Mr. Stuart said the warehouse priority order did not affect pre-existing higher ratings which may have been issued in particular cases, except that any higher rated tonnage will have to come out of the quota. In any event, he said, a mill is not obligated to honor the higher priority rating received through an individual order from a customer.

In an effort to assist those warehouses which so far have been unable to make satisfactory reports under the steel warehouse priority order announced Sept. 4, the OPM priorities division on Tuesday made public an amendment to Preference Rating Order M-21-b. The original order provided deliveries after Oct. 5 to warehouses which had not been assigned quotas on the basis of their reports of deliveries during the first quarter of 1941. However, because many of the reports received by the iron and steel branch have had to be returned for correction, the warehouses which submitted them have not been assigned quotas.

The effect of the amendment just assigned is to extend the date after which such warehouses may not accept deliveries from Oct. 5 to Oct. 31. The amendment provided, however, that no shipments are entitled to the A-9 preference rating established by the earlier order unless a quota and a rating certificate have actually been issued.

THIS WEEK'S Priorities and Prices

Scrap steel and iron placed under full priorities in order M-24, effective Oct. 11. (OPM-PM1335). "One of the largest broker-dealers" forced by OPA to refund all monies collected in excess of ceiling prices on all sales since Sept. 2. (OPM-PM1337). Authority to import scrap at prices in excess of established maximums granted; Cincinnati named as new basing point for scrap of railroad origin. (OPA-PM1353)

Zinc price schedule setting prime Western metal at 8.25c. lb., East St. Louis, and high grade at 9.25c. to be issued shortly. These prices about 1c. above present levels. (OPA-PM1340). Increased prices expected to stimulate output by 10 to 15 per cent or enough to take care of all existing defense and civilian needs. (OPM-PM1348)

Copper scrap price schedule, No. 20, revised to place prices on a shipping point area. Premiums established for briquetting and other changes made. (OPA-PM1349)

Twelve additions made to list of health supplies eligible for preference ratings under Order P-29. (OPM-PM1322)

Aluminum foundries being checked by Department of Labor to ascertain degree of compliance with priorities orders and regulations. (OPM-PM1320)

Old auto junking campaign extended to Indiana. (OPM-PM1317)

New system of checking serious cases of priorities unemployment set up to speed handling of such cases. (OPM-PM1328)

Crude oil situation in the Mid-continent area being surveyed to determine if requested price increases should be granted (OPA-PM1350)

Steel casting committee appointed. Will advise on price ceiling now being prepared. (OPA-PM1323)

No public or private construction project which uses critical materials may be started during the present emergency unless projects are for direct defense use or essential for health and safety. (SPAB-SPA9)

Aircraft manufacturers given permission to accept specified civilian orders (SPAB-SPA8)

New machine tools may be subjected to a price ceiling. Washington meeting scheduled for Oct. 22 to consider this question. (OPA-PM1331)

Some plumbing code standards in defense housing may be relaxed in the interest of conserving critical materials. (OPM-PM1330)

Passenger automobile quotas for January, 1942, discussed at Washington meeting Oct. 15. (OPM-PM1345)

Household washer and ironer industry certified as facing priorities unemployment. War Department to attempt to place orders with the industry. (OPM-PM1341)

Limitation order L-1-a and preference rating order P-54, covering heavy and medium motor trucks and truck trailers extended one month. (OPM-PM1358)

Defense production clinic to be held at Hotel Stevens, Chicago, Oct. 22 to 24. (OPM-PM1361)

Tire manufacturers granted permission to raise consumer prices not more than 9 per cent over June 16 levels. (OPA-PM1360)

Priorities Division, OPM, opens new field offices in Memphis, Louisville, Nashville, Helena, Mont., Knoxville, New Orleans and Oklahoma City, Okla. (OPM-PM1362)

Tank making covered by two new priority orders, Nos. P-26-e and P-25-e. Ratings are for component parts, accessories and armament. (OPM-PM1359)

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For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in parentheses after each paragraph (OPM-PM1300 means announcement 1300 issued by Office of Production Management.)

Weekly Steel Output in September 2nd Highest On Record

• • • **Reflecting the** shorter month and the Labor Day shutdown observed in some plants, steel ingot production in September was slightly below the August total, according to the American Iron and Steel Institute. Average output per week during September, however, not only exceeded the August average, but was the second highest on record.

The total of 6,819,706 net tons of steel ingots and castings produced during September compares with 7,000,957 tons in August and 6,056,246 tons in September, 1940.

Steel output in the first nine months of this year totaled 61,550,888 tons, fully 30 per cent above output in the corresponding period of 1940 and within 8 per cent of the record-breaking tonnage produced in the whole year 1940.

Production during September was equivalent to 96.4 per cent of the industry's capacity, compared with an operating rate of 95.7 per cent of capacity in August. In September, 1940, when capacity was substantially less than at the present time, the operating rate was 90.6 per cent.

	OUTPUT IN NET TONS					PER CENT OF CAPACITY			
	Open Hearth	Bessemer	Electric	Total	Weekly Output	Open Hearth	Bessemer	Electric	Total
1940									
January	5,356,444	285,447	122,832	5,764,723	1,301,292	85.7	56.1	77.0	83.4
February	4,208,249	205,458	112,090	4,525,797	1,093,188	72.1	43.2	75.2	70.0
March	4,078,843	191,568	118,772	4,389,183	990,786	65.3	37.6	74.5	63.5
1st Quarter	*13,643,536*	*682,473*	*353,694*	*14,679,703*	*1,129,208*	*74.4*	*45.7*	*75.6*	*72.3*
April	3,808,031	176,419	116,024	4,100,474	955,821	62.9	35.8	75.1	61.2
May	4,583,771	258,741	125,270	4,967,782	1,121,395	73.4	50.8	78.5	71.8
June	5,222,120	305,115	130,208	5,657,443	1,318,751	86.3	61.9	84.3	84.5
2nd Quarter	*13,613,922*	*740,275*	*371,502*	*14,725,699*	*1,131,875*	*74.2*	*49.5*	*79.3*	*72.5*
1st 6 months	*27,257,458*	*1,422,748*	*725,196*	*29,405,402*	*1,130,542*	*74.3*	*47.6*	*77.4*	*72.4*
July	5,269,701	322,567	132,357	5,724,625	1,295,164	84.5	63.5	83.2	83.0
August	5,670,932	369,770	145,681	6,186,383	1,396,475	90.8	72.6	91.3	89.5
September	5,535,198	365,289	155,759	6,056,246	1,415,011	91.7	74.2	101.1	90.6
3rd Quarter	*16,475,831*	*1,057,626*	*433,797*	*17,967,254*	*1,368,412*	*89.0*	*70.1*	*91.7*	*87.7*
9 months	*43,733,289*	*2,480,374*	*1,158,993*	*47,372,656*	*1,210,339*	*79.2*	*55.1*	*82.2*	*77.5*
October	6,059,792	408,317	176,433	6,644,542	1,499,897	97.0	80.2	110.6	96.1
November	5,872,162	420,448	176,497	6,469,107	1,507,950	97.1	85.3	114.2	96.6
December	5,907,840	399,434	188,083	6,495,357	1,469,538	94.8	78.6	118.2	94.1
4th Quarter	*17,839,794*	*1,228,199*	*541,013*	*19,609,006*	*1,492,314*	*96.3*	*81.3*	*114.3*	*95.6*
Total	*61,573,083*	*3,708,573*	*1,700,006*	*66,981,662*	*1,281,210*	*83.5*	*61.7*	*90.3*	*82.1*
1941									
January	6,271,862	451,637	205,256	6,928,755	1,564,053	99.0	76.0	93.4	96.9
February	5,673,289	378,330	186,281	6,237,900	1,559,475	99.2	70.5	93.9	96.6
March	6,461,936	460,169	209,536	7,131,641	1,609,851	102.0	77.4	95.4	99.7
1st Quarter	*18,407,087*	*1,290,136*	*601,073*	*20,298,296*	*1,578,406*	*100.1*	*74.8*	*94.2*	*97.8*
April	6,130,638	395,009	232,081	6,757,728	1,575,228	99.9	68.6	109.1	97.6
May	6,360,211	444,361	250,560	7,101,759	1,592,581	100.4	74.8	114.0	98.7
June	6,103,767	458,242	238,721	6,800,730	1,585,252	99.5	79.6	112.2	98.2
2nd Quarter	*18,594,616*	*1,297,612*	*721,362*	*20,613,590*	*1,584,442*	*100.0*	*74.3*	*109.8*	*98.2*
1st 6 months	*37,001,703*	*2,587,748*	*1,322,435*	*40,911,886*	*1,581,441*	*100.1*	*74.5*	*101.6*	*98.0*
July	6,089,859	489,239	242,584	6,821,682	1,543,367	94.4	85.0	87.4	93.4
August	6,243,100	495,523	262,334	7,000,957	1,580,351	96.6	85.9	94.4	95.7
September	6,058,731	500,687	260,288	6,819,706	1,593,389	97.0	89.8	96.9	96.4
3rd Quarter	*18,391,690*	*1,485,449*	*765,206*	*20,642,345*	*1,572,151*	*96.0*	*86.8*	*92.9*	*95.2*
9 months	*55,408,224*	*4,073,197*	*2,069,467*	*61,550,888*	*1,578,228*	*98.7*	*78.6*	*98.2*	*97.0*

Source: American Iron and Steel Institute. Data based on reports by companies which in 1940 produced 98.43 per cent of open hearth, 100 per cent of bessemer and 85.82 per cent of electric ingots and steel for castings. Annual capacity, as of Dec. 31, calculated as follows: 1940, open hearth 73,721,592 net tons, bessemer 6,009,920 tons, electric 1,882,630 tons; 1941, to and including June, open hearth 74,565,510 tons, bessemer 6,996,520 tons, electric 2,586,320 tons; beginning July, 1941, open hearth 76,079,130 tons, bessemer 6,793,400 tons, electric 3,272,370 tons, total 86,144,900 tons.

Molybdenum Output Increases in August

Washington

• • • **Production of** molybdenum in August, 1941, rose to 3,780,300 lb. from 3,354,200 lb. in July according to the Bureau of Mines. Shipments totaled 4,264,700 lb. and 2,961,700 lb. respectively. August shipments for domestic consumption were 2,216,400 lb. compared with 2,601,500 lb. in July. Export shipments in August rose sharply to 2,048,300 lb. from 360,200 lb. in the preceding month. Stocks at mines at the beginning of the respective months were 18,581,000 lb. and 18,188,600 lb. and at the end of each month stocks were 18,096,700 lb. and 18,581,100 lb. The average monthly rate of production and shipments in 1940 was 2,859,400 lb. and 2,110,800 lb., respectively.

Rehabilitation of Chester Furnace Urged by OPM

Washington

• • • **W. A. Hauck, OPM steel** consultant, recommended this week in a report to the RFC (for final action by OPM Director General William S. Knudsen), that the blast furnace formerly owned by the Delaware River Steel Co., at Chester, Pa., be rehabilitated and put into operation by the Pittsburgh Coke & Iron Co., a Hillman subsidiary, confirming reports to this effect in THE IRON AGE, Sept. 18.

Mr. Hauck's report pointed to the "acute shortage" of pig iron in the eastern Pennsylvania district, and estimated that the furnace will produce from 120,000 to 144,000 tons of pig iron annually. Pittsburgh Coke & Iron Co., will operate the furnace under a lease agreement.

European Munitions Cleaning Technique

(CONCLUDED FROM PAGE 41)

table equipped with suitable fittings in which the shells are set upright. Loading and unloading is carried on by one man at the turntable, in a manner similar to that of the machine in Fig. 1. These shells are loaded individually and pass through the different operating sections, cleaning, rinsing, drying, and cooling off, in a circular motion.

Standard units were proposed for an hourly output of 50 to 100 shells. As in the preceding case, such machines should be sunk underground so that the turntable is at floor level. In practice, the cleaning of shells more than 155 mm. in diameter was mostly carried on in still tanks, on which nothing special is worth mentioning except insofar as the ingenuity of the handling operations is concerned.

In the flow sheet for Class A, a washing and pickling operation takes place after forging. Automatic machines of exactly the same type as ordinary washing machines were planned for the pickling operation, but the fabrication of such pickling machines had to be discontinued owing to the lack of the stainless steel, aluminum-bronze material and accessories required. Consequently the old still tanks of wood, more or less improved in design, were currently used.

Coming Events

Oct. 14 to 17—American Institute of Steel Construction, annual convention, New York.

Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.

Oct. 20 to 24—National Metal Congress, Philadelphia. Annual meeting of American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers, and Wire Association. Also, Exposition of equipment, materials and processes.

Oct. 20 to 22 — American Gear Manufacturers' Association semi-annual convention, Edgewater Beach Hotel, Chicago.

Oct. 20 to 22—American Gas Association, Atlantic City, N. J.

Oct. 21 to 23—Manufacturers' Products Exhibit, Sponsored by Purchasing Agents' Association of Baltimore, Baltimore, Md.

Oct. 23 and 24—Society of Automotive Engineers, Tulsa, Okla.

Oct. 24 and 25—Foundry Equipment Manufacturers Association, annual meeting, White Sulphur Springs, W. Va.

Oct. 28 to 31—National Association of Refrigerating Engineers, Detroit.

Oct. 30 to Nov. 1—Society of Automotive Engineers, National aircraft production meeting, Biltmore Hotel, Los Angeles.

Nov. 10 to 12—The National Aircraft Standards Committee, annual meeting, Hotel Lexington, New York.

British 18,000-ton Barbed Wire Order Causes Shortage

Pittsburgh

• • • **Orders for approximately** 18,000 tons of barbed wire to be shipped to the British during October and November were recently allocated to manufacturers. It is believed that deliveries to non-defense users will be postponed indefinitely because of the British order and other heavy demands from our own government.

OPM Pig Iron Report May Now Be Filed on the 12th

Washington

• • • **The OPM priorities** division on Tuesday amended preference rating order M-17 to permit the filing of reports by pig iron producers on or before the 12th of each calendar month. The amendment also provides that the return of these reports by the OPM iron and steel branch shall be made on or before the 25th of the same month.

Government Gets Reinforcing Steel Before It's Needed

Pittsburgh

• • • **Close to one-fourth** of War Department reinforcing bar projects, totaling about 30,000 to 40,000 tons a month, are being shipped to the building site before the steel is actually needed.

If proper shipping schedules were set up for such projects by allowing steel companies to make proper arrangements with prime contractors without the interference or red tape of well-meaning government officials, more material would be released for other urgent jobs.

Another major factor which is causing useless expense, red tape, and loss of time is the practice of some War Department procurement officials in duplicating their purchases of concrete bars. Many times the bars have been bought from more than one company and the first company to deliver gets the sale while the other companies remain under the impression that the bars are to come from them. Most large concrete bar projects for the Army require extensive blueprint and specification writings and much of this is wasted effort.

"The real culprit who has made us short of steel and aluminum and other needed materials is Mr. Hitler." —Read J. H. Van Deventer's editorial, "The Goat Hunters" on Page 23 of this week's IRON AGE.

An actual case, it has been learned, involved the contract calling for approximately 3200 tons of bars. The mill receiving the order from the contractor had made elaborate plans with the latter to ship the material as needed. However, the War Department procurement division on this particular job actually went to about 20 concrete bar firms and purchased approximately 2400 tons in lots of 100 to 200 tons each. Most of these 20 firms immediately began to ship the material to the site of the project, not knowing that originally the contract had been let to one company with approval of the War Department and with a shipping schedule which took considerable time to construct.

Government Awards . . .

War Dept., Ordnance:

Acme Tin Plate & Roofing Supply Co., Philadelphia; liners, metal. $38,817
Adirondack Foundries & Steel, Inc., Watervliet, N. Y.; castings & pattern 10,164
Affiliated Machine & Tool Co., New York; gages 3,377
Ahlberg Bearing Co., Chicago; roller bearings 3,387
Ajax Electrothermic Corp., Boston; furnaces, induction 17,600
Allegheny Ludlum Steel Corp., Watervliet, N. Y.; steel 1,008
Aluminum Company of America, Massena, N. Y.; wire 14,840
Aluminum Goods Mfg. Co., Manitowoc, Wis.; cartridge cases 470,000
American Awning & Canvas Co., Springfield, Mass.; cases, cleaning rod 2,449
American Brass Co., Waterbury, Conn.; wire 1,181
brass 6,524
American Car & Foundry Co., New York; parts for tanks 150,599
American Chain & Cable Co., Inc., Detroit; cables & fittings 2,374
American Locomotive Co., New York; steel springs 1,573
American Manganese Bronze Co., Philadelphia; bronze bar 4,733
American Metal Co., Ltd., New York; solder 29,730
American Steel Foundries, Chicago; castings, heat treated 9,832
J. Harold Andre, Davenport, Iowa; seamless steel tubing 2,927
Apco Mossberg Co., Attleboro, Mass.; wrenches 7,140
Arrow Tool & Reamer Co., Detroit; end mills 1,512
Art Steel Co., Inc., New York; chests, accessory 1,030
Atlas Ansonia Mfg. Co., New Haven; fuzes 455,500
Austin Hastings Co., Inc., Cambridge, Mass.; steel 1,491
Axelson Mfg. Co., Los Angeles; gages 2,067
Badewell Mfg. Co., Los Angeles; machines, precision 1,702
M. W. Baker Co., Bryn Mawr, Pa.; projectiles 183,000
Barbour Stockwell Co., Cambridge, Mass.; castings 1,524
W. F. Barnes & John Co., Rockford, Ill.; square ram hydraulic units for motor drive 2,119
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; parts for carburetor 2,845
Bilgram Gear & Machine Works, Inc., Philadelphia; machinery 4,925
S. W. Bliss Co., Philadelphia; clutches, shafts, gears & pins 1,560
Bliss & Laughlin, Inc., Buffalo; steel 8,116
Bohn Aluminum & Brass Corp., Detroit; brass rods 8,284
Boston Pipe & Fittings Co., Inc., Cambridge, Mass.; pipe, black steel 1,307
Boyd-Wagner Co., Chicago; grinders 1,245
Breeze Corps., Inc., Newark; parts for engines 4,539
parts for tanks 2,172
Bridesburg Engineering Co., Philadelphia; tools, pins, keys, etc. 1,060
Bridgeport Machines, Inc., Bridgeport, Conn.; turret milling machines 3,075
Brown-Lipe Gear Co., General Drop Forge Division, Buffalo; drop forgings 1,030
Brown & Sharpe Mfg. Co., Providence; indicators, dial test 1,080
grinding machines 35,476
steel parallels 2,754
Bulova Watch Co., Long Island City; hammer spring weights 5,822
Cape Ann Tool Co., Pigeon Cove, Mass.; forgings 3,507
Carnegie-Illinois Steel Corp., Chicago; steel 11,923
Carpenter & Paterson, Inc., Medford, Mass.; castings, bronze 3,519
Chase Brass & Copper Co., Waterbury, Conn.; brass 16,957
Chicago Coil Spring Co., Chicago; springs 1,079
Collis Co., Clinton, Iowa; parts for tanks 2,209
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.; accelerators 5,360
Columbia Steel & Shafting Co., Pittsburgh; steel 46,296
Columbus Forge & Iron Co., Columbus, Ohio; forgings 6,465
Consolidated Packaging Machinery Corp., Buffalo; punches, dial assemblies, locating arms, fixtures, bushings & plate insert 7,422
Continental Motors Corp., Detroit; engines 7,596
parts for tanks 4,894
Continental Piston Ring Co., Memphis, Tenn.; projectiles 400,000
Crescent Electric Supply Co., Davenport, Iowa; cable 1,653
Crosbie Co., Washington; files 1,252
Crosby Co., Buffalo; magazines 175,000
Crosby Steam Gage & Valve Co., Boston; gages 4,166
Crucible Steel Co. of America, New York; nickel, chromium 2,346
steel 8,993
Crucible Steel Casting Co., Milwaukee; castings, heat treated. 11,750
Cushman Chuck Co., Hartford; chucks 7,400
Dana Tool-D. Nast Machinery Co., Philadelphia; saws, metal slitting 1,494
Dempster Bros., Inc., Knoxville, Tenn.; buckets for hoist unit 4,500
Detroit International Trading Co., Detroit; vises & slotmasters 6,076
Detroit Seamless Steel Tubes Co., Detroit; spare parts & assemblies for gun mounts 1,342
Dover Stamping & Mfg. Co., Cambridge, Mass.; filling funnels 1,210
E. I. du Pont de Nemours & Co., Pompton Lakes, N. J.; blasting caps 138,750
Eagle Lock Co., Terryville, Conn.; screws, brass 1,146
Eaton Mfg. Co., Detroit; volute springs 26,660
Eis Mfg. Co., Inc., Middletown, Conn.; casings 7,986
Electric Wheel Co., New York; trailers 2,369
E. L. Essley Machinery Co., Chicago; parts for honing machine 1,026
Ever-Tite Mfg. Co., Davenport, Iowa; brackets, cast steel 1,189
Excel-Foundry & Machine Co., Fall River, Mass.; fuzes 2,494,000
Federal Machinery Co., Chicago; presses 11,882
Federal Products Corp., Providence; gages 1,590
Federal Tool Corp., Chicago; gages 5,018
Firth-Sterling Steel Co., New York; blanks, carbide 1,659
cupping dies 1,908
Florsheim Shoe Co., Chicago; bandoleers for cartridges 3,250
Food Machinery Corp., Peerless Pump Division, Canton, Ohio; pump, deep well turbine 4,657
Fox Munition Corp., Philadelphia; gages 8,665
General American Transportation Corp., Chicago; shells 239,000
General Electric Co., Schenectady; induction motors 1,136
General Electric Co., Lamp Department, Philadelphia; lamps 2,215
General Metalware Co., Minneapolis; tube, accessories, packing. 321,408
General Motors Corp., Detroit; guns 27,009,376
General Motors Sales Corp., New Departure Division, Bristol, Conn.; bearings 4,164
General Motors Sales Corp., Hyatt Bearings Division, Chicago; roller bearings 1,365
General Steel Castings Corp., Eddystone, Pa.; parts for gun carriages 2,600,000
General Time Instrument Corp., Westclox Division, LaSalle, Ill.; parts for mechanical time fuze. 213,696
Great Lakes Steel Corp., Detroit; steel plates 3,127
steel 12,185
Greene-Wolf Co., Inc., Brooklyn; wire, copper 1,547
Greenfield Tap & Die Corp., Greenfield, Mass.; gages 4,311
Gries Reproducer Corp., New York; gages 1,278
Guiberson Diesel Engine Co., Chicago; parts for tanks 10,867
tools 3,701
Hamilton Watch Co., Lancaster, Pa.; fuzes 5,720,000
Louis Hanssen's Sons, Davenport, Iowa; wire rope & wire cables. 23,187
Hardinge Brothers, Inc., Elmira, N. Y.; lathes 12,237
Hartford Electric Steel Co., Roxbury, Mass.; attachment brackets 1,915
R. G. Haskins Co., Chicago; tapping equipment & motors for pumps 882
Charles E. Hayes Co., Springfield, Mass.; cable 2,575
Heald Machine Co., Worcester, Mass.; machines, boring & grinding 993,990
Heller Brothers Co., Newark, N. J.; files 3,172
Hendey Machine Co., Torrington, Conn.; lathes 2,965
Heppenstall Co., Pittsburgh; blocks, steel die 1,058
Hercules Powder Co., Wilmington, Del.; machines, primer mixing. 69,000
Clinton E. Hobbs Co., Everett, Mass.; blocks, duplex chain 1,156
Hoover Co., North Canton, Ohio; steel caps for fuzes 10,524
plunger heads 17,646
fuzes 1,984,000
Industrial Stamping & Mfg. Co., Detroit; chutes, cartridge holder 5,124
Ingersoll-Rand Co., Boston; grinders, drill & rammers 1,160
compressor, air 13,240
Inland Steel Co., Chicago; steel 791,700
International Machine Tool Corp., Indianapolis; motors, electric 11,696
International Nickel Co., Huntington, W. Va.; nickel copper alloy 6,274
forgings 81,105
B. Jahn Mfg. Co., New Britain, Conn.; gages 7,944
Jamestown Steel Partitions, Inc., Jamestown, N. Y.; metal partitions 5,099
Jeffrey Mfg. Co., Philadelphia; crushers 2,095
G. O. Jerrold, New York; steel 13,370
Kelsey-Hayes Wheel Co., Detroit; guns 2,952,798
Walter Kidde & Co., Inc., New York; fire extinguishers 1,075
H. R. Krueger & Co., Detroit; recentering machine 7,510
Lamson & Sessions Co., Cleveland; nuts 3,982
Landers, Frary & Clark, New Britain, Conn.; fuzes 860,000
Landis Tool Co., Waynesboro, Pa.; grinding machines 35,348
Larkin Packer Co., Inc., Davis Boring Tool Division, St. Louis; boring bars 4,590
Latham Machine Co., Pittsburgh; gages 2,013
Latrobe Electric Steel Co., New York; tool steel 5,039
Leach Co., Oshkosh, Wis.; fuze bodies 132,300
Leidy Electric Co., Phillipsburg, N. J.; line starters & switches

& ducts & cables 1,187
Leitelt Brothers, Chicago; castings 2,499
Letts Drop Forge, Inc., Detroit; forgings 5,428
Link Belt Co., Indianapolis; casings, burster 13,341
Lloyd & Arms, Inc., Philadelphia; lathes 4,376
Logansport Machine, Inc., Logansport, Ind.; cylinders, cams, pilots, springs, etc. 6,184
Lowell Wrench Co., Worcester, Mass.; wrenches 3,655
Edward A. Lynch Machinery Co., Philadelphia; grinders 1,706
Machinery Manufacturing Co., Los Angeles; machines, milling 4,359
Machinery & Welder Corp., Moline, Ill.; welding rods 1,633
Magee Sheet Metal Machinery Co., Ypsilanti, Mich.; wiring machines 1,877
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; gages 6,500
Jas. H. Matthews & Co., Newark; dies, wedges, washer, blanks, bushings & indicators 1,029
McArdel & Cooney, Inc., Philadelphia; plumbing equipment 1,374
McEvoy Co., Houston; tripod mounts 120,175
McGill Mfg. Co., Valparaiso, Ind.; ball bearings 2,887
McKenna Metals Co., Philadelphia; tools 2,262
McKiernan-Terry Corp., Dover, N. J.; staking machines 485,330
Metal Goods Corp., St. Louis; brass rod & bronze bar 3,133
Micromatic Hone Corp., Detroit; parts for micromatic honing heads & honing stones 4,276
Midway Electric Supply Co., Brooklyn; cables 1,838
Benedict Miller, Inc., Newark; steel 1,919
Moore Special Tool Co., Inc., Bridgeport, Conn.; dies 7,750
Morse Tool Co., Detroit; cutting tools 859,444
Multi-Products Tool Co., Newark; anvils, pins, punches, springs, plungers & strippers 7,850
Murchey Machine & Tool Co., Detroit; heads, die & chasers 2,311
A. F. Murphy Die & Machine Co., Boston; plate stampings 5,609
Nash Engineering Co., South Norwalk, Conn.; wrought iron tank 1,088
National Broach & Machine Co., Detroit; cutters 1,110
Nelpin Manufacturing Co., Long Island City; gages 1,107
New England Pressed Steel Co., Natick, Mass.; gas retainers ... 12,605
New York Engineering Co., New York; units, melt 34,055
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn.; placing drill points on drill shanks 1,030
reamers, arbors, blades, nuts & locking cams 2,772
shanks, gun barrel drill 2,640
gage blocks 1,360
Norma-Hoffmann Bearings Corp., Stamford, Conn.; ball bearings. 1,566
Norton Co., Worcester, Mass.; grinding wheels 1,783
Ohio Seamless Tube Co., Shelby, Ohio; tubing, seamless steel ... 2,658
Ohio Steel Foundry Co., Lima, Ohio; alloy steel castings 1,600
Otis Elevator Co., Buffalo; castings, steel 8,023
Otis Steel Co., Cleveland; steel .. 2,480
Owatonna Tool Co., Owatonna, Minn.; handles for wrenches .. 1,350
Pallet Sales Corp., New York; pallets, double faced 4,320
Parent Metal Products, Inc., Philadelphia; steel cabinets, work benches & shelving 1,712
Parish Pressed Steel Co., Reading, Pa.; gun carriages 2,394,697
Charles Parker Co., Meriden, Conn.; adaptors 1,560
Peck Stow & Wilcox Co., Southington, Conn.; hammers 2,041
Philadelphia Bronze & Brass Co., Philadelphia; forgings 1,320
Pipe Machinery Co., Cleveland; gages 6,615
Pittsburgh Forging Co., Coraopolis, Pa.; shells 280,000
Poor & Co., Canton Forge & Axle Works Division, Canton, Ohio; forgings 6,386
Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass.; lathes ... 3,577
Pratt & Latchworth Co., Inc., Buffalo; castings; yokes; cranks, hoop 27,635
steel castings 1,203
Precision Mfg. Co., Philadelphia; reconditioning gages 1,483
Prophylactic Brush Co., Florence, Mass.; magazines & dies 6,082
Putnam Tool Co., Detroit; reamers, cutters & drills 64,326
Rapid Cutting Co., Brooklyn; separator assemblies for carton packing 1,819
Rasmussen Machine Co., Inc., Racine, Wis.; hacksaw machines & metal cutting machines 30,756
Read Machinery Co., York, Pa.; shells 620,775

SEE ARMCO "DEFENSE" METALS
AT THE SHOW

Saving money and improving products are good reasons for bringing your "defense" metal equipment problems to ARMCO. One way to do it is to talk with experienced ARMCO men in Booth F 31 at the National Metal Congress in Philadelphia.

"Defense" will be the keynote of the ARMCO exhibit. Among other metal products you will see a complete air-raid and munitions shelter partly buried in a miniature hillside.

An information booth will be there for your convenience. Here questions on uses, welding, finishing and forming of various metal sheets for defense jobs will be answered by ARMCO engineers. They will also show fabricating and finishing operations on such ARMCO specialty sheets as Stainless Steel, PAINTGRIP and ZINCGRIP.

ARMCO representatives at the Show will gladly discuss specific applications with you. At other times write direct to us for information on ARMCO metals in your defense products. The American Rolling Mill Co., 3021 Curtis St., Middletown, Ohio.

VISIT THE ARMCO BOOTH...F31

Reliance Steel Casting Co., Pittsburgh; castings 9,152
Republic Steel Corp., Cleveland; pig iron 2,318
steel 169,015
Revere Copper & Brass, Inc., Detroit; brass bar 2,867
brass 1,089
Robertshaw Thermostat Co., Youngwood, Pa.; boosters 1,720,800
Robinson Manufacturing Co., Muncy, Pa.; machines, ammonium nitrate screening 14,625
Rockford Machine Tool Co., Rockford, Ill.; shapers 5,951
Roura Iron Works, Detroit; boxes, slag, welded steel 1,050
SKF Industries, Inc., Philadelphia; sleeves & bearings 2,998
roller bearings 1,139
Saginaw Stamping & Tool Co., Saginaw, Mich.; trailers 89,062
Sawyer Engineering Co., Syracuse, N. Y.; motors for attachment to machine tools 6,699
Scaife Co., Oakmont, Pa.; equalizing tanks 2,038
Schauer Machine Co., Cincinnati; lathes 4,516
Schutz O'Neill Co., Minneapolis; pulverizers 9,150
Scovill Mfg. Co., Waterbury, Conn.; brass rods 1,024
Sears Saddlery Co., Davenport, Iowa; tank helmets 25,610
Sheffield Corp., Dayton, Ohio; gages 4,386
W. E. Shipley Machinery Co., Philadelphia; machines, cold sawing; blades & grinders 22,588
parts for screw machines 1,294
Simonds Saw & Steel Co., Boston; blades, hack saw 2,093
saws, cross-cut 9,720
Simplex Wire & Cable Co., Cambridge, Mass.; cable 2,225
Sipp Eastwood Corp., Paterson, N. J.; bushings, stops, plates, shanks, spring & screws 4,331
thread cleaning machines 10,746
housing, slider 2,700
Slaymaker Lock Co., Lancaster, Pa.; eccentric steel pins 1,662
Southern Engineering & Metal Products Corp., Miami, Fla.; projectiles 210,000
Sperry Gyroscope Co., Inc., Brooklyn; cams 33,000
Springfield Machine Tool Co., Springfield, Ohio; attachments for lathes 1,360
Stanley Works, Stanley Tools Division, New Britain, Conn.; screw drivers 1,242
vises 3,300
Star Machine & Tool Co., Cleveland; fixtures 1,156
Stark & Co., Philadelphia; running gears for trucks 1,493
Stewart-Warner Corp., Chicago; compressors, grease portable ... 3,642
Stromberg Time Corp., Des Moines, Iowa; electric time recorders .. 1,928
Suburban-Essex Machinists, Inc., Orange, N. J.; gages, inspection 2,827
Superior Sheet Steel Co., New York; terne plate 1,972
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.; steel 354,888
Threadwell Tap & Die Co., Greenfield, Mass.; taps & dies 17,691
Titeflex Metal Hose Co., Newark; assemblies, ignition harness ... 3,630
Torrington Co., Torrington, Conn.; machines 1,735
cutters, milling 4,129
Tredegar Co., Richmond, Va.; projectiles 70,735
Tri-Metal Products Corp., Conshohocken, Pa.; castings 12,192
Turner Brass Works, Sycamore, Ill.; blow torches 4,311
Union Manufacturing Co., New Britain, Conn.; chucks & face plates for automatic turret lathes 8,203
Union Twist Drill Co., Athol, Mass.; end mills 6,640
cutting tools 1,581
Unique Specialties Co., New York; punches, screws, washer, jaws & holders 1,370
United Aircraft Products, Inc., Dayton, Ohio; valves, assembly. 3,150
United States Machine Tool Co., Cincinnati; milling machines .. 4,145
Universal-Cyclops Steel Corp., Titusville, Pa.; steel 2,362
Vanadium Corp. of America, New York; ferrochrome & ferrosilicon 13,031
Van Norman Machine Tool Co., Springfield, Mass.; grinders & milling machines 239,670
machines, milling 5,287
Veit & Young, Philadelphia; punches 6,090
Victor Animatograph Corp., Davenport, Iowa; parts for tanks ... 1,481
Vinco Corp., Detroit; angle tangent 509
gages 2,700
Henry Vogt Machine Co., Louisville, Ky.; shells 374,000
Vulcan Mold & Iron Co., Latrobe, Pa.; molds, chill, cast iron 34,832
Waltham Gage Co., Detroit; gages, inspection 3,765

IMMEDIATE RELIEF

IN FORGINGS the waste of metal can be reduced to an irreducible minimum. The first essential for lessening waste of metal is forging to close tolerances. Forgings formed to close tolerances effect an increase in the capacity of both machine tools and skilled craftsmen because such forgings having no excess metal, require less machining and finishing time. Users of T & W forgings are realizing substantial reductions in the waste of metal, and consequently, reductions in the cost of finishing forgings. T & W forgings are formed to close tolerances. Ask a T&W forging engineer about how to get relief from time wasting grief in finishing forgings.

FORGINGS
USUALLY COST LESS AT THE POINT OF ASSEMBLY

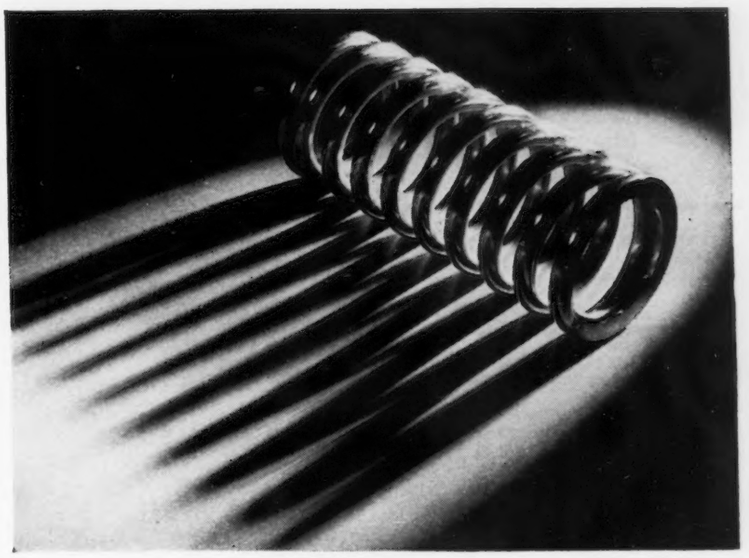
TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

Walworth Co., Boston; supplies, plumbing 1,605
Ward Leonard Electric Co., Philadelphia; fuses, clips & plates .. 6,153
Warner & Swasey Co., Cleveland; parts for turret lathes 1,026
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; crank header 8,636
Watson-Stillman Co., Roselle, N. J.; presses, hydraulic straightening 129,500
Weatherhead Co., Cleveland; elbows for tubing 1,029
F. W. Webb Mfg. Co., Boston; supplies, plumbing 1,659
Joseph Weidenhoff, Inc., Chicago; chargers, storage battery 3,080
West Haven Foundry Co., West Haven, Conn.; bronze hammers. 6,037
Western Cartridge Co., Winchester Repeating Arms Division, New Haven, Conn.; pressure guns .. 1,505
Western Machine Tool Works, Holland, Mich.; shapers, ram 42,918
E. S. Westinghouse Co., Wetmore-Savage Division, Boston; cable, lead covered 1,005
White Motor Co., Cleveland; fuses, gaskets, bolts, control assemblies, rear mirrors, radiator filler caps, etc. 1,568
G. Whitfield Richards, Philadelphia; compound, special cutting 3,894
Wiederhold & Hubbard, Inc., New York; gages 3,794
J. H. Williams & Co., Buffalo; forgings 18,900
Wollaston Brass & Aluminum Foundry, N. Quincy, Mass.; castings 3,635
Alan Wood Steel Co., Dover, N. J.; aggregates 7,200
John Wood Mfg. Co., Inc., Muskegon, Mich.; parts for gun recoil mechanisms 124,204
Worcester Pressed Steel Co., Worcester, Mass.; carrier plates 2,889
York Safe & Lock Co., York, Pa.; shot 1,064,000
Zimmerman Steel Co., Bettendorf, Iowa; castings 30,652
Zipit Corp., Philadelphia; gages.. 7,719

War Dept., Corps of Engineers

American Cast Iron Pipe Co., Birmingham, Ala.; cast iron watermain plugs, tees, etc., Tuskegee Pilot Training School, Ala. $20,268
American Chain & Cable Co., Inc., New York; plow steel wire rope 5,996
American Heating Engineering Co., Inc., Washington; warm air heating systems, Bolling Field, D. C. 8,300
Belmont Iron Works, Philadelphia; structural metal, Presque Isle, & Houlton, Me., airports 89,700
structural metal, Aberdeen Proving Grounds, Md. 30,885
Bethlehem Steel Co., Bethlehem, Pa.; structural steel, Presque Isle, & Houlton, Me., airports. 89,650
Binks Mfg. Co., Los Angeles; spray booth, Aircraft Assembly Plant, Fort Worth, Texas 4,915
Briggs-Weaver Machinery Co., Dallas; speed milling machines & accessories, Aircraft Assembly Plant, Fort Worth, Texas 51,562
drilling machines, Aircraft Assembly Plant 11,352
all-steel shears, Aircraft Assembly Plant 5,329
Buffalo Forge Co., Buffalo; conoidal fans, Aircraft Assembly Plant, Fort Worth, Texas 2,105
California Wire Cloth Corp., Seattle; wire fence 17,791
Canatsey Electric Mfg. Co., Kansas City; magnetic inspection machines & demagnetizers, Aircraft Assembly Plant, Kansas City, Kan. 4,814
Chicago Pneumatic Tool Co., Los Angeles; riveters, Aircraft Assembly Plant, Fort Worth, Texas 14,068
Cleveland Pneumatic Tool Co., Cleveland; compression riveters, Aircraft Assembly Plant, Fort Worth, Texas 48,000
Cobb Bros. Construction Co., Inc., Meridian, Miss.; construction of concrete parking apron pavement, Key Field, Meridian, Miss. 60,256
Cole Supply Co., Ltd., Tuscaloosa, Ala.; fire hydrants, Tuskegee Pilot Training School, Ala. 2,568
Diamond Truck Sales Corp., New York; buses 8,385
Ehret Magnesia Mfg. Co., Valley Forge, Pa.; steel & wrought iron pipe, Bolling Field, D. C. 5,050
Ellfeldt Hardware & Machinery Supply Co., Kansas City; band saws, Aircraft Assembly Plant, Kansas City, Kan. 2,508
Everson Mfg. Co., Chicago; chlorination system, Aircraft Assembly Plant, Fort Crook, Neb. 2,449
Fairbanks-Morse & Co., Los Angeles; portable airplane scales, Aircraft Assembly Plant, Fort Worth, Texas 3,200
Faspray Corp., Red Bank, N. J.; dishwasher, Aircraft Assembly Plant, Fort Crook, Neb. 4,860



Why We're Stepping Up Our Advertising To Bring You News About Springs

IN THE NEXT few months—through the advertisements of this company—you are going to see a series of stories about springs that have never been told, or well told, before. If you design, specify or buy springs, these stories will interest you. They can influence the performance of your product and increase the satisfaction of your customers.

We are going to tell this story because many people still feel that a spring is a "hunk of wire."

The simple truth is that spring manufacturers, with few exceptions, have outgrown the by-guess-and-by-gosh way of making springs. Rule-of-thumb methods have been replaced by scientific formula, scientific manufacturing and scientific testing.

The astronomical number and variety of springs used today, the kinds of wire and finishes, and the functional responsibilities placed on springs make the help of spring engineers not only advisable but profitable.

As you run across the next advertisement of this series in this publication, and those to follow—remember that they're worth reading.

HUNTER PRESSED STEEL COMPANY, LANSDALE, PA.

HUNTER
Science in Springs

Florida Pipe & Supply Co., Jacksonville, Fla.; pipe & fittings, Grimes Advanced Single Engine Flying School, Dothan, Ala..... 4,361
valves, Tuskegee Pilot Training School, Ala. 2,279

Cornell G. Fuller, Barnwell, S. Car.; construction of soil cement parking apron, Meridian Airfield, Meridian, Miss. 74,689

General Cable Corp., Philadelphia; copper, wire, Advanced Single Engine Flying School, Grimes, Ala. 5,806

Hamilton-Huster Machinery Co., Dallas; disc grinders & accessories, Aircraft Assembly Plant, Fort Worth, Texas 2,869
band saws, Aircraft Assembly Plant, Fort Worth, Texas 2,163
drilling machines & accessories, Aircraft Assembly Plant 4,076
iron workers and accessories, Aircraft Assembly Plant 2,441
hand millers, Aircraft Assembly Plant 2,419

Kenneth B. Hanaway, Springfield, Ohio; bulldozers, Patterson Field, Ohio 3,000

C. J. Harter Machinery Co., Houston; press brakes, Aircraft Assembly Plant, Fort Worth, Texas 5,238

Ingersoll-Rand Co., New York; light weight riveters, Aircraft Assembly Plant, Fort Worth, Texas 11,080

J. I. Case Co., Racine, Wis.; industrial tractors, Aircraft Assembly Plant, Fort Worth, Texas 4,108

E. B. Kelley Co., Inc., Long Island City; pumps & suction hose.... 8,480

A. Leschen & Sons Rope Co., New York; plow steel wire rope 8,258

Lieb-Jackson, Inc., Columbus, Ohio; induced draft fan system, Patterson Field, Ohio 10,164

Machinery Sales Co., Los Angeles; jig borers & accessories, Aircraft Assembly Plant, Fort Worth, Texas 8,815

Machinery Sales & Supply Co., Dallas; machinists' vices, Aircraft Assembly Plant, Fort Worth, Texas 7,740
engine lathes, Aircraft Assembly Plant 15,857

Manhattan Boiler & Equipment Co., New York; boiler, accessories & replacement box 4,971

Moore Machinery Co., Los Angeles; milling machines & accessories, Aircraft Assembly Plant, Fort Worth, Texas 19,874
radial drills & accessories, Aircraft Assembly Plant 22,182
open side planer, Aircraft Assembly Plant 25,406

National Tank & Manufacturing Co., Los Angeles; oil storage tanks, Victorville, Cal.; Las Vegas, Nev.; Phoenix, Tucson & Higley, Ariz. 21,600

Natural Gas Equipment Co., Los Angeles; salt bath furnace, Aircraft Assembly Plant, Fort Worth, Texas 8,138

Niles-Bement-Pond Co., Pratt & Whitney Division, Los Angeles; vertical shapers, Aircraft Assembly Plant, Fort Worth, Texas 5,147

Pacific Flush Tank Co., Chicago; rotary distributors & siphons, Advanced Twin Engine School, Valdosta, Ga. 13,911

H. O. Penn Machinery Co., Inc., New York; diesel electric sets, spare generator & replacement parts 11,170
replacement parts 26,032

I. W. Phillips & Co., Tampa, Fla.; nails, MacDill Field, Fla. 2,981

Pioneer Engineering Works, Inc., Minneapolis; rock crushing plant & replacement parts 7,245

Pomona Pump Co., Inc., New York; pumping units 8,937

Rocky Mountain Steel Products, Inc., Los Angeles; Pony Express electric trucks, Aircraft Assembly Plant, Fort Worth, Texas 8,310

Savory, Inc., Newark; toasters, Biloxi, Miss., Training School.. 4,141

Seeger Refrigerator Co., St. Paul; rivet coolers, Aircraft Assembly Plant, Fort Worth, Texas 8,350

Southern Supply Co., Dallas; electric welders & accessories, Aircraft Assembly Plant, Fort Worth, Texas 2,410

Star Manufacturing Co., Oklahoma City; structural steel, anchor bolts, siding, roofing, etc. for Air Corps Hangars, Cochran Field, Macon, Ga. 56,626

Sterling Motors Corp., Long Island City; tractor chassis, tanks, platform bodies, trailers & replacement parts 62,913
motor trucks and parts 62,913

Truscon Steel Co., New Orleans; steel windows, Biloxi, Miss., Aviation Mechanics' Training School 8,358

Tynes Bros., Birmingham, Ala.; rail steel reinforcement bars, Tyndall Field, Panama City, Fla. 5,270

We also make all types of round and flat wire springs and wire parts.

ARMY CHOW

The Army needs pots and pans and baskets, pails and buckets

FOR ALL OF WHICH WE MAKE HANDLES!

IF YOU USE WIRE HANDLES for government, industry, or consumer requirements . . .

Whether for dish pans, pots, griddles, tea kettles, baskets or appliances of any kind, you'll find no more dependable or more capable source of supply than Cuyahoga!

Cuyahoga Handles are made in any commercial metal, hot-tinned, plated, or finished in color!

THE CUYAHOGA SPRING CO.
10280 BEREA RD. · CLEVELAND, OHIO

United States Pipe & Foundry Co., Birmingham, Ala.; cast iron pipe, Tyndall Field, Panama City, Fla. 10,376
Wallace & Tiernan Co., Inc., Newark; chlorinating equipment, MacDill Field, Fla. 3,082
Weir Body Co., Omaha, Neb.; bench tops, Aircraft Assembly Plant, Fort Crook, Neb. 6,038
Well Machinery & Supply Co., Fort Worth, Texas; rotary reversible screw drivers, Aircraft Assembly Plant, Fort Worth, Texas..... 3,525
drill presses, Aircraft Assembly Plant 15,761
rotary air drills, Aircraft Assembly Plant 3,225
Wheeling Steel Corp., Wheeling, W. Va.; sheets, steel 2,616
York Ice Machinery Corp., York, Pa.; compressors, accessories, supplies 2,863

War Dept., Quartermaster Corps:

Atlantic Stamping Co., Rochester, N. Y.; dippers, tin $4,500
E. C. Atkins Co., Indianapolis, Ind.; component parts for kits, tool, carpenters' & wheelrights' 574
Wm. R. Bootz, Successor Crescent Stove Works, Evansville, Ind.; component parts & accessories for field ranges 184,395
Chicago Lock Co., Chicago; padlocks for lockers, trunks 2,829
Chicago Tool & Kit Mfg. Co., Chicago; component parts for field ranges 3,370
Coleman Lamp & Stove Co., Wichita, Kan.; component parts for field ranges 5,894
gasoline lanterns & mantles ... 3,876
Connecticut Valley Mfg. Co., Centerbrook, Conn.; component parts for kits, tool, carpenters' & wheelwrights' 1,014
H. C. Cook Co., Ansonia, Conn.; component parts for field ranges 1,800
County Supply Co., Plainfield, N. J.; component parts for kits, tool, carpenters' & wheelwrights' 686
Delta Electric Co., Marion, Ind.; lanterns 2,085
Diamond T Motor Car Co., Chicago; trucks, 4-ton, wrecker .. 2,035,386
Henry Disston & Sons, Inc., Philadelphia; component parts for kits, tool, carpenters' & wheelwrights' 587
Dover Stamping & Mfg. Co., Cambridge, Mass.; pans, cake, tin.. 5,500
Electric Boat Co., Bayonne, N. J.; spare parts for boats 3,552
Enterprise Tool & Metal Works, Chicago; component parts & accessories for field ranges 102,438
Federal Prison Industries, Washington, D. C.; mess trays 615
Ford Motor Co., Dearborn, Mich.; truck-chassis 521,001
Foster & Creighton Co., Nashville, Tenn.; construction of motor repair shops, grease racks, wash racks & oil houses, Camp Forrest, Tenn. 150,800
Four Wheel Drive Auto Co., Clintonville, Wis.; tractors 189,781
General Motors Corp., Chevrolet Division, Detroit; trucks, 1½-ton 284,468
trucks, ¾-ton 28,343
trucks, 1-ton 1,102
Gray Marine Motor Division, General Motors Corp., Detroit; spare parts for boats 3,277
Hall Scott Motor Car Co., New York; engines 20,650
Hardware & Supply Corp., Kansas City, Mo.; component parts for kits, tool, carpenters' & wheelwrights' 1,228
International Harvester Export Co., Chicago; spare parts for trackers 15,185
International Silver Co., Meriden, Conn.; forks 20,330
knives 114,750
spoons 21,900
Irwin Auger Bit Co., Wilmington, Ohio; component parts for kits, tool, carpenters' & wheelwrights' 1,695
William Johnson, Inc., Newark, N. J.; component parts for kits, tool, carpenters' & wheelwrights' 961
Kirk & Blum Mfg. Co., Cincinnati; cradles, cook pot 1,740
Landers, Frary & Clark, New Britain, Conn.; knives 103,230
Lindsay Light & Chemical Co., West Chicago; mantles for gasoline lanterns 10
Louisville Tin & Stove Co., Louisville, Ky.; shields, water heater, case 1,710
Mack Mfg. Corp., Plainfield, N. J.; spare & tools for wreckers ... 57,447
spare parts for trucks 51,292
Maclane Hardware Co., New York; component parts for kits, tool, carpenters' & wheelwrights' ... 587
Jas. P. Marsh Corp., Chicago; gages, air pressure 10,500
Milcor Steel Co., Milwaukee; tool boxes 7,980
National Brush Co., Aurora, Ill.; brush, wire 2,000
H. K. Porter, Inc., Everett, Mass.; wire cutters 168,130

"I WANT THE BEST POSSIBLE JOB — I MUST HAVE A GOOD OIL!!"

"THAT'S WHY I CALLED THE CITIES SERVICE LUBRICATION MAN IN" SAYS A. E. DAVEY, PRESIDENT OF ALLOY STEEL GEAR AND PINION COMPANY OF CHICAGO.

"I'm doing a job here that must be perfect when it leaves the shop. The people who get the gears are plenty critical." Mr. Davey says further, "I don't know everything about oil. That is why I called in the Cities Service Lubrication man. I expect him to work with my men to see that they get the oil best suited for the job."

A. E. Davey

All Gleason, Fellows Gear Shapers, Lee Bradner and Brown & Sharpe machines, are operated with Cities Service Lubricants. You, too, will find these high-quality fluids capable of doing the kind of work your customers want.

Much work in this shop must meet rigid government inspection.

Call us in for consultation — there is no charge for the service. Write us on your letterhead or mail the coupon for a copy of our booklet, "Metal Cutting Lubrication."

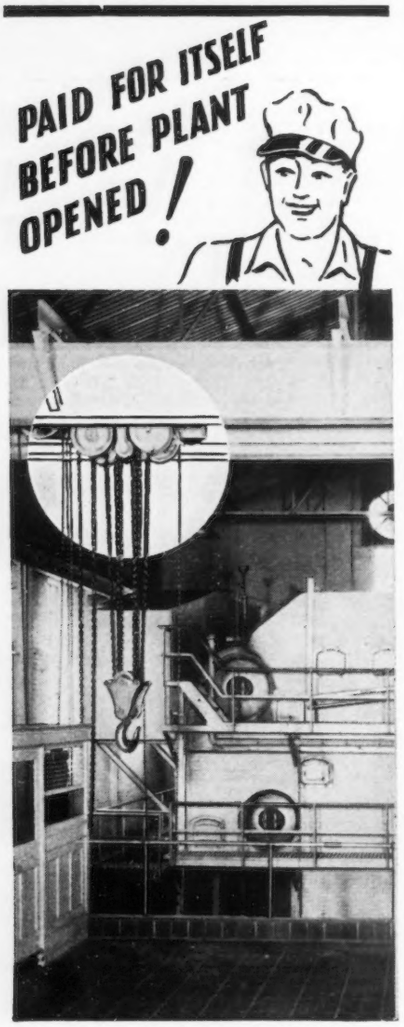
CITIES SERVICE OILS — ONCE-ALWAYS — Cutting Oils "SERVICE PROVED"

FREE Just clip and mail

CITIES SERVICE OIL COMPANY
Sixty Wall Tower, Room 1330, New York

Please send me a copy of your booklet, "Metal Cutting Lubrication."

Name.....
Firm Name.....
Address.....
City..... State.....



An old stable in Utah was being converted to a modern power house. First move was to install this 15-ton, 36' span Reading Crane. Then, with its help, 800 cubic yards of dirt were moved, 600 cubic yards of concrete poured, and two 18-ton, 250 H.P. boilers and two 500 H.P. uniflow engines installed, together with generators, exciters, etc.

"The crane was also used," says the Contractor, "for painting the ceiling and other purposes. Frankly, during the construction it saved the owner and ourselves more than its cost." Now it's standing by for coal and ash handling and emergency use.

No need to say more—just remember that it was Reading-designed and built—and there are more where it came from.

READING CHAIN & BLOCK CORP.
DEPT. 211 READING, PA.

READING
Chain Hoists, Electric Hoists, Cranes and Monorails

GOVERNMENT AWARDS

Presto Gas Mfg. Co., Chicago; component parts & accessories for field ranges 70,293
Ritter Brothers, Harrisburg, Pa.; two-car grease & inspection rack shelter, Indiantown Gap, Military Reservation, Pa. 7,128
Sargent & Co., New Haven, Conn.; component parts for kits, tool, carpenters' & wheelwrights' ... 3,043
Wm. Schellhorn Co., New Haven, Conn.; wire cutters 168,130
Schrade Cutlery Co., Walden, N. Y.; pocket knives 5,238
Stanley Tools, New Britain, Conn.; component parts for kits, tool, carpenters' & wheelwrights' ... 11,035
Taylor Metal Products Co., Mansfield, Ohio; component parts & accessories for field ranges 10,114
Union Hardware Co., Torrington, Conn.; component parts for kits, tool, carpenters' & wheelwrights' 437
Vaughan-Bushnell Mfg. Co., Chicago; component parts for kits, tool, carpenters' & wheelwrights' 1,242
R. Wallace & Sons Mfg. Co., Wallingford, Conn.; spoons ... 35,000
forks 35,600
Washburn Co., Rockford, Ill.; screw drivers, common 672
White Motor Co., Cleveland; solid axle beams 37,812
Wisconsin Abrasive Co., Milwaukee, Wis.; component parts for kits, tool, carpenters' & wheelwrights' 801
Yale & Towne Mfg. Co., Chicago; padlocks for lockers, trunks ... 833
Yellow Truck & Coach Mfg. Co., General Motors Truck & Coach Division, Pontiac, Mich.; trucks, 2½-ton 1,581,444

War Dept., Signal Corps:

American Electrical Heater Co., Detroit; soldering irons $5,625
Belden Mfg. Co., Chicago; cable.. 3,300
Bonney Forge & Tool Works, Allentown, Pa.; holding tools 842
Chicago Tool & Kit Co., Chicago; hammers & screwdrivers 1,131
Cook Electric Co., Chicago; jacks 27,880
H. M. Cornelius Co., New York; tool equipment 24,837
S. H. Couch Co., Inc., North Quincy, Mass.; terminal strips.. 726
Diamond Expansion Bolt Co., Inc., Garwood, N. J.; racks 637
Fred Ehrick Co., Brooklyn; rolls 21,896
Electric Storage Battery Co., New York; batteries 4,671
Fairbanks Co., New York; trucks 714
Chas. Fischer Spring Co., Brooklyn; casing, shafting, sleeves, nuts, etc. 21,425
General Cable Corp., New York; cable, telephone 94,640
Graybar Electric Co., Inc., New York; cable & reels 380,836
Karp Metal Products, Inc., Brooklyn; boxes 19,984
Lafayette Iron Works, Brooklyn; ground rods 1,063
Precision Mfg. Co., North Chicago; ground rods 10,800
Teletype Corp., Chicago; printers 704,653
Utica Drop Forge & Tool Co., Utica, N. Y.; pliers 1,030
Utilities Service Co., Allentown, Pa.; clamps & steps 3,059
Western Electric Co., Inc., Kearny, N. J.; cases, cord & panels 31,023

War Dept., Air Corps:

Talbert Abrams, Lansing, Mich.; printer assemblies $190,684
Acklin Stamping Co., Toledo, Ohio; airplane mooring parts 12,450
Adams & Westlake Co., Elkhart, Ind.; adapter assemblies 65,051
Aluminum Co. of America, Washington; rivets, aluminum alloy.. 56,941
Baker Raulang Co., Industrial Truck Division, Cleveland; electric trucks 77,730
Bell Aircraft Corp., Buffalo; tool kits 208,927
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; carburetor assemblies & spare parts 224,596
motor, valve & charger assemblies 147,840
maintenance parts 130,765
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; pump & valve assemblies 55,440
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; instruments 66,645
Butler Mfg. Company, Kansas City; hangars, portable 283,320
Cleveland Pneumatic Tool Co., Cleveland; high pressure air pumps 75,000
Crosley Corp., Cincinnati; bolt & bracket assemblies 51,565
Curtiss-Wright Corp., Buffalo; maintenance parts for airplanes.... 53,367
Douglas Aircraft Co., Inc., Santa Monica, Cal.; cowlings 155,532
Electric Auto Lite Co., Moto-Meter Gauge & Equipment Division, La-Crosse, Wis.; gages 356,735
General Electric Co., Schenectady; instruments 228,000
General Motors Corp., Indianapolis; tools 159,460
Graybar Electric Co., Inc., Dayton, Ohio; fuses 22,690
Harrisburg Steel Corp., Harrisburg, Pa.; gas cylinders 2,951,980
Heald Machine Co., Worcester; machines (boring) 142,699
Holley Carburetor Co., Detroit; carburetors & spare parts 23,297
Homelite Corporation, Port Chester, N. Y.; power plant electric portable units 461,400
International Harvester Export Co., Chicago; trucks, refueling 199,476
Keystone Trailer & Equipment Co., Kansas City; trailers & dolly converters 467,720
Walter Kidde & Co., Inc., New York; fire extinguisher equipment 219,243
E. A. Kinsey Co., Inc., Dayton, Ohio; milling machines 105,172
Kline Manufacturing Co., Columbus, Ohio; windlass assemblies 100,800
Lawson Manufacturing Co., Pittsburgh; stand assemblies 150,056
Link Aviation Devices, Inc., Binghamton, N. Y.; sextants 78,125
North American Aviation, Inc. Inglewood, Cal.; flexible cells & installation parts for gun compartments 153,450
Rockford Screw Products Co., Rockford, Ill.; flat head & taper pins 27,803
Seifreat-Elstad Machinery Co., Dayton, Ohio; milling machines.... 92,175
Sparks Withington Co., Jackson, Mich.; airplane mooring parts.. 36,805
release assemblies 503,400
Sperry Gyroscope Co., Inc., Brooklyn; aircraft equipment 152,400
Stewart-Warner Corp., Chicago; portable ground heaters 567,000
Taylor-Wharton Iron & Steel Co., Easton, Pa.; gas cylinders 1,493,457
United Aircraft Corporation, Pratt & Whitney Aircraft Division, East Hartford; engine tools 192,688
United-Carr Fastener Corp., Cambridge, Mass.; fasteners, snap, ring, socket, etc. 58,806
U. S. Department of Agriculture Forestry Service, Washington; steel towers 110,000
United States Gauge Co., New York; gages 150,960
Vultee Aircraft, Inc., Downey, Cal.; gas tanks 490,000

PERSONALS . . .

• **H. S. Brink,** formerly assistant plant industrial engineer, has been named plant industrial engineer of the Gary works of Carnegie-Illinois Steel Corp., in a series of personnel changes at that plant. **E. H. Gott** has been transferred from the industrial engineering department to the maintenance department where he is assistant division superintendent of maintenance. **J. F. Frain,** formerly superintendent of the 12-in. No. 1 merchant mill, becomes superintendent of the 44-in. blooming and 36-in. slab mill. **W. N. Nagel,** who was assistant to division superintendent of the plant maintenance division, has been appointed assistant plant industrial engineer. **F. L. Collins,** formerly assistant division superintendent of power and fuel, becomes electrical engineer. **H. R. Middlebrook,** formerly assistant division superintendent of maintenance has been appointed assistant division superintendent, power and fuel.

• **Elmer Isgren,** former plant superintendent has been appointed manager of the entire factory of R. G. LeTourneau Inc., at Peoria, Ill. He succeeds **Ray Peterson,** vice-president and plant manager, who resigned Sept. 15 to conduct business on the West Coast. Mr. Isgren started with LeTourneau in February, 1930, in the shop at Stockton, Cal. He went to Peoria with the LeTourneau organization in 1935 as a welding foreman and was promoted to plant superintendent in 1937.

Maurice Foote succeeds Mr. Isgren as superintendent of Plant 1 and **C. D. Cook** has been named superintendent of Plant 2.

• **Frank B. Bell,** president, Edgewater Steel Co., Pittsburgh, recently civilian chief of the Pittsburgh Army Ordnance District, has been appointed to the Office of Production Management in Washington as assistant to E. F. Johnston, chief, ordnance, aircraft and machine tool production. Mr. Bell, widely known throughout steel and ordnance circles, is in direct charge of ordnance production for the entire United States. **J. D. Berg,** chairman of the board of the Dravo Corp., Pittsburgh, has been appointed to succeed Mr. Bell at the Pittsburgh Army Ordnance District.

• **George J. Huebner,** publisher of the Tool & Die Journal, the publication of the Tool and Die Institute, has been called to Washington to act as tooling consultant in the new contract distribution division of OPM. Mr. Huebner has been secretary of the Automotive Tool and Die Manufacturers Association, of Detroit, and national secretary of the Special Tool, Die and Machine Shop Institute. He was also the industry code authority in NRA days.

• **Paul M. Janko** who has been covering the Pittsburgh area for Moslo Machinery, Inc., Cleveland, has been named sales manager. **R. C. Burton** has been added to the Moslo staff to direct advertising and sales promotion activities of the company.

• **Dr. H. A. Jones** has been named manager of sales of electronic tubes for the General Electric Co., Schenectady, N. Y. Dr. Jones was graduated from Pennsylvania State College in 1918 and received his doctor of philosophy degree from Princeton in 1922. He joined the General Electric Co., Schenectady works, in 1922 as a chemist in the research laboratory and in 1928 was transferred to the commercial general section, selling special products developed in the

H. S. BRINK, plant industrial engineer, Gary Works, Carnegie-Illinois Steel Corp.

J. F. FRAIN, superintendent of the 44 in. blooming and 36 in. slab mill at Gary.

ELMER ISGREN, plant manager, R. G. LeTourneau, Inc., Peoria, Ill.

GE laboratories. The following year, Dr. Jones was named manager of this special products section which in 1930 was made a part of the industrial department.

• **O. J. Pearre** has been appointed arc welding specialist in the General Electric Philadelphia office, succeeding **W. A. Terry,** recently transferred to general sales work. Mr. Pearre went to the General Electric company immediately after his graduation from Lehigh University in 1931 with a bachelor of science degree in mechanical engineering. In his new capacity, Mr. Pearre will have charge of GE electric welding sales along the Atlantic seaboard.

• **H. R. Bristol** has been transferred from the Chicago office of the Bristol Co., Waterbury, Conn., to its Boston office, 250 Stuart Street. **J. E. Booth** has been named to the position just vacated by Mr. Bristol.

• **B. E. Middleton,** formerly Chicago representative for McKenna Metals Co., Latrobe, Pa., has been appointed representative in the Central New York territory with headquarters at 217 East Avenue, Rochester.

• **Clem W. Gottschalk** has been appointed general traffic manager of Jones & Laughlin Steel Corp., Pittsburgh, succeeding **H. E. Graham** who has requested that he be retired Nov. 1. Mr. Gottschalk has been assistant traffic manager since 1932 and has been with Jones & Laughlin since before World War I during which time he served as a radio instructor. Prior to going to Jones & Laughlin, Mr. Gottschalk had been with the Erie Railroad as telegraph operator and local freight agent at the Kensington Avenue Station, Buffalo, and later as rate clerk in the general agent's office at Pittsburgh.

Mr. Graham was for 10 years assistant to the president and general traffic manager. He went to Jones & Laughlin from the American Car & Foundry Co. where he had been associated for about 15 years.

• **C. D. Prickett,** vice-president and director of the Hercules Powder Co., Inc., Wilmington, Del., has resigned from the company after 28 years of service. When the Hercules Powder company was formed in 1913, he became a director and assistant general manager and a few months later was elected a vice-president.

• **Wilbur G. Wood,** for the past three years staff engineer with Lockheed Aircraft Corp., Burbank, Cal., has been appointed chief engineer of the new hydraulic strut division of Menasco Mfg. Co., also of Burbank.

• **W. G. Prasse,** formerly Eastern representative of the Oilgear Co., Milwaukee, has been appointed sales manager of the company.

• **John Brooks,** assistant production manager in charge of customer contacts at the AC Spark Plug division of General Motors, has been lent to the British Purchasing Commission as an adviser on planning and production. Mr. Brooks has been with the AC division for the last 18 years.

• **Simon J. Katz,** of the Atlantic Steel & Iron Co., Springfield, Mass., has been elected president of the Southern New England chapter of the Institute of Scrap Iron and Steel, Inc. Other newly-elected officers include: S. Samuel Kasden, of H. Kasden & Sons, Inc., New Haven, vice-president; and Joseph A. Schiavone, of Michael Schiavone & Sons, Inc., secretary-treasurer.

• **Morrison McCormick,** secretary-treasurer of the Copper Roof Co., Milwaukee, has been called from the reserve into active service with the army as cavalry instructor at Fort Riley, Kan.

• **John A. Payne,** president of Consolidated Coppermines, Inc., New York, **Oliver H. Payne,** of New York and **Robert Simon,** president of Liberty Aircraft Products Corp., Farmingdale, L. I., have been elected to membership on the board of directors of the Autocar Co., Ardmore, Pa., to fill vacancies caused by the resignations of **Walter S. Mack, Jr.,** president of Phoenix Securities Corporation, **Edward A. LeRoy, Jr.,** and **C. B. Colpitts,** all of New York.

• **William A. Craig** has been appointed purchasing agent of the Link-Belt Co.'s Philadelphia plant, to succeed **James C. Lenahan,** who died suddenly on Sept. 7 at Somers Point, N. J. Mr. Lenahan, a Link-Belt employee for 36 years, had been purchasing agent since 1918. Mr. Craig joined Link-Belt in 1916 in the Philadelphia plant purchasing department. As assistant purchasing agent, he had been Mr. Lenahan's direct assistant for many years.

• **John F. McKernan,** until recently chief of equipment in the

C. W. GOTTSCHALK, general traffic manager, Jones & Laughlin Steel Corp., Pittsburgh.

W. A. CRAIG, purchasing agent of Link Belt Co.'s Philadelphia plant.

production division of the OPM, has returned to the Western Electric Co., New York, in the newly-created post of manager of defense program planning, charged with coordinating production on the company's $100,000,000 defense job. A veteran of more than 20 years' service with Western Electric, Mr. McKernan was program planning manager at New York headquarters from 1935 to 1937, and merchandise manager at the Point Breeze plant until early this year, when he went to the OPM. **George R. Logan,** associated with Mr. McKernan briefly in Washington, and previously in the Western Electric organization, will serve as his lieutenant at Kearny.

• **Wallace W. Lockwood** has been named advertising manager of the Taylor Instrument Companies, Rochester, N. Y., to replace **Elmer E. Way,** who has resigned. A graduate of Syracuse University, Mr. Lockwood joined the Taylor advertising department in 1932 and was made assistant advertising manager in 1939. His previous connections were with the Lapp Insulator Co., Leroy, N. Y., the Z. L. Potter Advertising Agency and the David Tynion Advertising Agency, both of Syracuse.

• **Stanley Bracken** has been appointed to the newly-created post of general manager of manufacture of the Western Electric Co., New York. Mr. Bracken has a record of 29 years of service with Western Electric, having started after his graduation from the University of Nebraska in 1912 as a student engineer in the Hawthorne Works.

• **Walter E. Hawkinson,** treasurer of the Allis-Chalmers Mfg. Co. since 1936, was elected to the joint position of secretary-treasurer on Oct. 2. He assumes the secretarial duties of **William A. Thompson,** company vice-president and secretary, who resigned recently. The new secretary started with Allis-Chalmers 34 years ago in the treasurer's department. In 1926, he became assistant manager of the tractor division, but returned to the treasurer's department in 1936.

Mr. Thompson's resignation terminates 40 years of service at Allis-Chalmers, having begun as a general bookkeeper in the accounting department of the company.

OBITUARY...

• **John B. Ford,** pioneering industrialist and an executive in numerous glass, chemical and shipping firms, died at his Grosse Point, Mich., home on Oct. 8, aged 75 years. He was a grandson of John Baptiste Ford, early steel maker and founder of the Pittsburgh Plate Glass Co. Mr. Ford, born in 1866 at New Albany, Ind., and educated at Western University of Pennsylvania and Harvard University, joined his grandfather in 1891 in the first exploitation of Michigan chemical mineral wealth, extracting salt at Wyandotte, near Detroit, for manufacture of soda ash. When the health of the elder Ford failed, his grandson took over the plant, then known as the J. B. Ford Co. The company changed its name in 1894 to the Michigan Alkali Co. After the death of the elder Ford in 1903, John B. Ford became head of all the affiliated concerns, including the Wyandotte Portland Cement Co. Quarries were opened at Alpena, Mich., and Ford organized the Wyandotte Transportation Co. to operate a large fleet of Great Lakes freighters. In 1939 he was succeeded as president of the Michigan Alkali Co. by John B. Ford, Jr., his son. Mr. Ford retained directorships in the Huron Portland Cement Co., the Libby-Owens-Ford Glass Co., and other firms until the time of his death.

• **Thomas J. Litle, Jr.,** former national president of the Society of Automotive Engineers, director of engineering for the Bendix Home Products Co., of South Bend, Ind., and one-time designer and research engineer in several automobile companies, died Oct. 6 at his home in South Bend. Mr. Litle first moved into design and research activities in 1900 when he organized a lighting company, marketing a high-powered gas lamp. The company was taken over by Welsbach Light Co., of which he became chief engineer. In this capacity he was credited with more than 100 inventions, and for research in the combustion of gases he won the gold medal research medal at the Panama-Pacific Exposition. In 1917 he joined the engineering department of Cadillac Motor Car Co. and in 1918 joined Lincoln Motor Car Co. In 1926 he became chief engineer of the Marmon Motor Car Co., Indianapolis, resigning three years later to become a consultant. He became chief engineer of Easy Washing Machine Co. in 1936.

• **Chester K. Wanamer,** marine engine designer with the Guild Marine Engine Co., instructor at the Ford Motor Co., and recently in the hardware business at Arlington, Mass., died there Tuesday, Oct. 7. He was born in Somerville, Mass., 49 years ago.

• **Arthur J. Schrage,** assistant superintendent of the Detroit Steel Corp., died recently aged 33 years.

• **Herman A. Brunn,** designer of custom-built automobiles and former president of the National Automobile Body Builders Association, died recently in Buffalo. He was 67 years old.

• **Cecil V. Eskridge,** of the Linde Air Products Co., New York, died in Chicago, Ill., on Sept. 21 at the age of 43. He had been associated with Linde since 1924, and represented the company in working with steel mills as a specialist in oxy-acetylene deseaming operations.

• **Thomas E. Henry,** founder and head of the Henry Furnace & Foundry Co., Cleveland, died Oct. 3, aged 73 years.

• **J. Clinton Davis,** consulting engineer and partner in J. B. Davis & Sons, civil engineers, died Oct. 2, in Cleveland. Mr. Davis formerly was a director of the American Gypsum Co., Port Clinton, Ohio, before its sale to the Celotex Corp. in 1939. He had been practicing engineering since 1900.

• **Augustan M. Lally,** manager of sales, National Tube Co., Pittsburgh, until his retirement several years ago, died Sept. 30 at his home in Pittsburgh. Mr. Lally began his career in the steel industry with American Tube & Iron Co., Cleveland, in 1886. He became associated with the National Tube Co. upon its organization.

• **Joseph Guy Stevens,** sales manager for the former Goodell & Pratt Co. and later treasurer of the Greenfield Machine Corp., died at Greenfield, Mass., Sept. 30, aged 61 years.

CONSTRUCTION STEEL

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Awards jump to 23,900 tons from 8400 last week; new projects advance to 12,800 tons from 9200 tons.

AWARDS

NORTH ATLANTIC STATES

170 Tons, Brooklyn Navy Yard, crane bridges, to American Bridge Co., Pittsburgh.

155 Tons, Jessup, Md., State bridge over Baltimore & Ohio Railroad tracks, to American Bridge Co., Pittsburgh.

110 Tons, Philadelphia, storehouse for Naval Hospital, to Lehigh Structural Steel Co., Allentown, Pa.

100 Tons, Lackawanna, N. Y., boiler house No. 3 for Bethlehem Steel Co., to Bethlehem fabricating plant, Buffalo.

100 Tons, Turner, Me., State bridge, to Bethlehem Steel Co., Bethlehem, Pa., through Walter V. Mitton, Inc., Augusta, Me., contractor.

THE SOUTH

4505 Tons, Elizabeth City, N. C., hangar for Navy, to American Bridge Co., Pittsburgh.

4200 Tons, Choteau, Okla., powder plant for E. I. du Pont de Nemours & Co., to Virginia Bridge Co., Roanoke, Va.

970 Tons, Yukon, Fla., seaplane hangar for Navy, to Ingalls Iron Works Co., Birmingham.

CENTRAL STATES

2200 Tons, Milwaukee, super-charger building for Allis-Chalmers Mfg. Co., to Worden-Allen Co., Milwaukee.

281 Tons, Cleveland, administration building for Cleveland Pneumatic Tool Co., to Burger Iron Works, Akron.

260 Tons, Rochelle, Ill., Whitcomb factory building, to Wendnagel & Co., Chicago.

120 Tons, Blue Island and Rockdale, Ill., signal bridges, to American Bridge Co., Pittsburgh.

WESTERN STATES

8000 Tons, Long Beach, Cal., Douglas Aircraft plant, to Bethlehem Steel Co., Los Angeles.

2000 Tons, Mare Island, Cal., ordnance machine shop, to Columbia Steel Co., San Francisco.

500 Tons, Benicia, Cal., ordnance machine shop, to Golden Gate Iron Works, San Francisco.

230 Tons, Los Angeles, Department of Water and Power transmission towers for Santa Fe relocation, to Emsco Derrick & Equipment Co., Los Angeles.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

5000 Tons, Duquesne, Pa., electric furnace building for Carnegie-Illinois Steel Corp.

1010 Tons, Mount Hope, N. J., shaft framing for Warren Foundry & Pipe Corp.

705 Tons, Aberdeen Proving Ground, Md., Army assembly shop.

430 Tons, New Brunswick, N. J., factory building for Mack Trucks, Inc.

386 Tons, Lancaster County, Pa., highway bridge on route 148; bids Oct. 17.

170 Tons, Waterbury, Conn., building for Eastern Color Print Co.

165 Tons, Hartford, Conn., boiler room, Hartford hospital.

160 Tons, Holyoke, Mass., Worthington Pump & Machinery Corp. machine shop.

125 Tons, New Haven, Conn., repair shop and terminal building for Leo F. Caproni.

130 Tons, Ellicott City, Md., railroad siding for Doughnut Corp. of America.

115 Tons, Bethpage, Long Island, N. Y., building for Grumman Aircraft Corp.

THE SOUTH

230 Tons, Hayesville and Ranger, N. C., foot bridges for TVA.

CENTRAL STATES

1400 Tons, Canton, Ohio, extension to electric furnace building, Republic Steel Corp.

485 Tons, Duluth, Minn., power house extension for Minnesota Power & Light Co.

345 Tons, Chicago, Western Avenue and Hoyne Street bridge for Grand Trunk Western Railroad Co.

145 Tons, Wood River, Ill., boiler supports for Shell Oil Corp.

110 Tons, Granite City, Ill., No. 3 open-hearth furnace for General Steel Castings Corp.

WESTERN STATES

1100 Tons, Fort Peck, Mont., power house; bids Nov. 21.

640 Tons, Benicia, Cal., inert materials warehouses for arsenal.

FABRICATED PLATES

PENDING PROJECTS

2500 Tons, Fort Peck, Mont., penstocks for power house; bids Nov. 21.

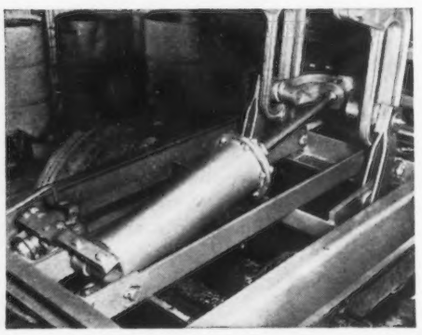
1500 Tons, California, 102-in. conduit; Bureau of Reclamation.

900 Tons, Pittsburgh, six barges for Dravo Corp.

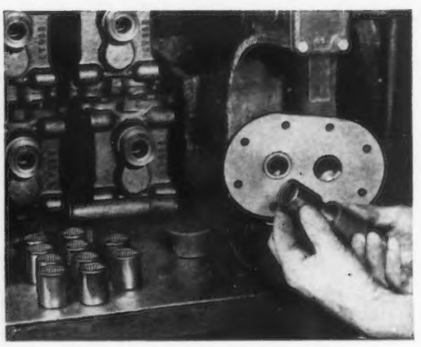
200 Tons, Arlington, Mass., 24-in. pipe for Metropolitan District Commission.

HOW EFFICIENCY IS BOOSTED, WEIGHT REDUCED IN MARION DUMP TRUCKS

1. THE PUMP IS THE HEART of the hydraulic hoist used in Marion Dump Trucks. "With the use of 4 anti-friction Torrington Needle Bearings, our pumps keep cool and efficient. The excellent lubricant-retention capacity of these bearings helps make the pumps highly serviceable under heavy loads at variable speeds up to 2500 rpm," says L. H. Guthery, vice-president of The Marion Metal Products Co.



2. "TORRINGTON NEEDLE BEARINGS require less space than other bearings of high load capacity. They permit lighter housings, less weight and more payload for our trucks," Mr. Guthery reports. "And easy, quick installation of these self-contained bearing units, using simple hand presses, gives us substantial savings in costs." Needle Bearings can often be used to replace plain bushings without extensive design changes.



Your product, too, can gain important advantages by utilizing the small size, high capacity, lubrication features and low cost of Torrington Needle Bearings. Call on our Engineering Department for full assistance. Write for Catalog No. 104. For Needle Bearings to be used in heavier service, write our associate, Bantam Bearings Corporation, South Bend, Indiana, for Booklet 104X.

THE TORRINGTON COMPANY, TORRINGTON, CONN., U. S. A. • ESTABLISHED 1866

Makers of Needle and Ball Bearings

New York Boston Philadelphia Detroit Cleveland Chicago London, England

TORRINGTON NEEDLE BEARING

Reinforcing Steel

Awards of 13,850 tons; 3700 tons in new projects.

AWARDS

ATLANTIC STATES

1000 Tons, Boston, harbor fortifications, 500 tons to Bethlehem Steel Co., Bethlehem, Pa., and 500 tons to Jones & Laughlin Steel Corp., Pittsburgh, Pa.; U. S. Engineers.

900 Tons, Sharon, Pa., Westinghouse tank transformer plant, to Jones & Laughlin Steel Corp. and Carnegie-Illinois Steel Corp., Pittsburgh; Corbetta Construction Co., contractor.

400 Tons, South Boston, Navy Yard buildings Nos. 30 and 31, to Truscon Steel Co., Boston, through Morton C. Tuttle Co., Boston, contractor.

380 Tons, Wilkes-Barre, Pa., Solomon Creek pumping station, to Bethlehem Steel Co., Bethlehem, Pa.; Sordoni Construction Co., contractor.

320 Tons, Kingston, Pa., Toby Creek intercepting sewer, to Bethlehem Steel Co., Bethlehem, Pa.; Thomas Proctor Co., contractor.

300 Tons, Everett, Mass., General Electric Co. plant, to Bethlehem Steel Co., Bethlehem, Pa.; Raymond Concrete Pile Co., contractor.

300 Tons, Newark, N. J., American Can Co. office building, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

240 Tons, Sandy Hook, Md., Potomac River bridge, to Bethlehem Steel Co., Bethlehem, Pa.; James McGraw Co., contractor.

200 Tons, Nutley, N. J., Hoffman LaRoche, Inc., requirements to Truscon Steel Co., Youngstown, through White Construction Co., Inc.

160 Tons, Philadelphia, Pa.; Quartermaster depot laboratory, Navy Yard, to Bethlehem Steel Co., Bethlehem, Pa.; Wark & Co., contractors.

120 Tons, Dover, N. J., buildings, Picatinny arsenal, to Bethlehem Steel Co., Bethlehem, Pa.; F. Briscoe Co., contractor.

100 Tons, Fort Monmouth, N. J., Army Signal Corps facilities, to Ceco Steel Products Co., Jersey City, N. J.; Ehret-Day Co., contractor.

100 Tons, Princeton, N. J., RCA research laboratory, to Bethlehem Steel Co., Bethlehem, Pa.; H. K. Ferguson & Co., contractors.

THE SOUTH

771 Tons, Jacksonville, Ark., 16 inert storage tanks for Arkansas ordnance plant, to Truscon Steel Co., Youngstown; through Ford, Bacon & Davis.

514 Tons, New River, N. C., contract NOY-4750 for Marine Barracks, to Truscon Steel Co., Youngstown.

479 Tons, State of Texas, highway work; 327 tons for Gonzales County, 152 tons, Franklin County, both to North Texas Iron & Steel Co., Fort Worth, Tex.

160 Tons, Houston, Tex., San Jacinto Ordnance Depot, to Truscon Steel Co., Youngstown; through Hubbard, Knudsen & Mitchell.

150 Tons, Avon, Ky., Lexington Signal Depot, to Truscon Steel Co., Youngstown; through Frank Messer & Sons.

CENTRAL STATES

500 Tons, Kingsbury, Ind., ordnance plant additional requirements, to Bethlehem Steel Co., Bethlehem, Pa.; Bates & Rogers, contractors.

388 Tons, Pontiac, Mich., Pontiac service and parts building, to Truscon Steel Co., Youngstown; through O. W. Burke Co.

WESTERN STATES

1100 Tons, Long Beach, Cal., Douglas Aircraft plant, to Blue Diamond Corp., Los Angeles.

654 Tons, Mecca, Cal., All-American Canal (Invitation C-42,220-A-1), reinforcing fabric, to Colorado Fuel & Iron Corp., Denver.

360 Tons, Los Angeles, North Figueroa Street bridge over Los Angeles River and Southern Pacific tracks, to Ceco Steel Products Co., Los Angeles.

272 Tons, San Diego, Cal., Naval Training Station expansion, to Truscon Steel Co., Youngstown, through J. Harvey Chambers.

100 Tons, Glendale, Cal., oil tanks and cooling tower, unit No. 2, municipal steam plant, to Truscon Steel Co., Los Angeles, through F. H. Strohecker Co., Los Angeles, contractor.

Weekly Bookings of Construction Steel

Week Ended →	Oct. 14, 1941	Oct. 7, 1941	Sept. 16, 1941	Oct. 15, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	23,900	8,400	15,600	33,071	1,083,695	874,836
Fabricated plate awards	0	0	2,100	1,995	105,425	122,670
Sheet steel piling awards	0	0	0	0	25,260	60,835
Reinforcing bar awards	13,850	11,855	10,310	9,865	609,380	374,260
Total letting of Construction Steel	37,750	20,255	28,010	44,931	1,823,760	1,432,601

GREAT BRITAIN

3854 Tons, export for British under lend-lease agreement, 3050 to Jones & Loughlin Steel Corp., Pittsburgh, and 804 tons to Youngstown Sheet & Tube Co., Youngstown.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1000 Tons, Fort Tilden, N. Y., two batteries; Johnston, Drake & Piper, low bidder.

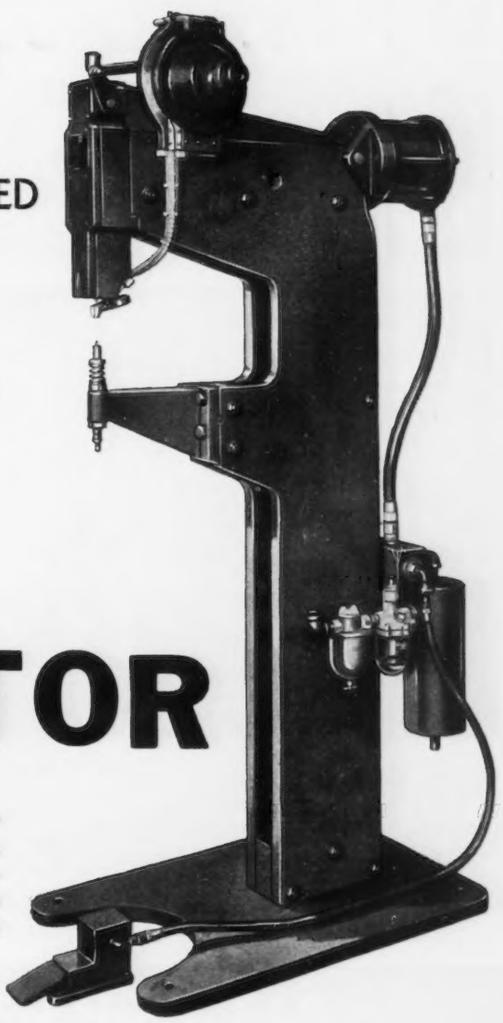
HANDLES FLUSH RIVETING

AIR SQUEEZE ACTION plus AUTOMATIC FEED RIVETING for AIRCRAFT PRODUCTION

the new

Air Powered

RIVITOR



it's fast

1600 riveted joints per hour with no manual rivet handling. This is an average figure. Increased or lowered production depends on the ease with which the work can be handled.

it's simple

therefore economical to maintain.

write for particulars to

THE TOMKINS-JOHNSON CO.

628 North Mechanic Street **Jackson, Michigan**

400 Tons, Niagara Falls, N. Y., Bell Aircraft plant; Austin Co., contractor.
200 Tons, Nutley, N. J., Hoffman-La Roche Inc., factory; White Construction Co., contractor.

THE SOUTH

375 Tons, Carrollton, Ky., substructure, Kentucky State bridge; Mississippi Valley Bridge & Iron Co., Leavenworth, Kan., low bidder on general contract.

CENTRAL STATES

160 Tons, Rockford, Ill., housing project.
140 Tons, Milwaukee, Shuster Stores addition.
100 Tons, Great Lakes Naval Station, Ill., sewage treatment plant.

WESTERN STATES

717 Tons, Mountain Home, Idaho, Anderson Ranch Dam (Invitation 22, 522-A); bids Oct. 17.
465 Tons, Coram, Cal., Shasta power plant (Invitation A-33,452-A); bids taken.

Pipe Lines

● **Illinois Pipe Line Co.,** Findlay, Ohio, plans new welded steel pipe line from Parkersburg oil field district, Bonpas Township, Richland County, Ill., to Lancaster, Ill., about nine miles, for crude oil transmission. Connection will be made with main pipe line system at last noted place.

Bureau of Reclamation, Denver, asks bids until Oct. 27 for one 34-in. diameter welded steel penstock for Wellsville Canal pumping station, Hyrum project, Utah (Specification 1575-D).

Waveland, Miss., asks bids until Nov. 4 for pressure pipe line system for natural gas distribution, including main steel pipe line for connection with supply source; also for control station and other operating facilities. F. P. Joseph, Glenmora, La., is consulting engineer.

Constructing Quartermaster, Gunter Field, Montgomery, Ala., has let contract to Alabama Gas Co., Watts Building, Birmingham, at $10,300, for natural gas pipe line system at Gunter Field.

General Purchasing Officer, Panama Canal, Washington, closes bids Oct. 22 for approximately 120,000 ft. of galvanized welded carbon steel pipe (Schedule 5615).

United States Engineer Office, Seattle, has let contract to Aqua Systems, Inc., 385 Gerard Avenue, New York, at $298,344, for pipe line system for gasoline fueling at Elmendorf Field, Fort Richardson, Anchorage, Alaska, with storage and operating facilities (Circular 67).

Cast Iron Pipe

● **Pascagoula, Miss.,** plans pipe line extensions and replacements in water system; also new steel storage tank, metering and chlorinating equipment and other waterworks installation. Cost about $148,000, of which $108,000 will be provided by municipality, and remainder, $40,000, secured through Federal aid.

Fayetteville, N. C., plans pipe line extensions in water system and other waterworks installation. Cost about $600,000, of which $300,000 will be secured through Federal aid and like amount furnished by municipality.

Danville, Iowa, plans water pipe line system and other waterworks installation; also sewage system and sewage disposal plant. Cost estimated at $120,300, of which $95,300 will be secured through Federal aid and remainder provided by municipality.

Oxford, Wis., plans pipe lines for water system and other waterworks installation. Cost about $40,000. Financing is being arranged through Federal aid. General Engineering Co., Portage, Wis., is consulting engineer.

Grand Prairie, Tex., plans water pipe line system and other waterworks installation, including new elevated steel tank and tower, drilling of well for supply source and installation of pumping equipment, and auxiliary apparatus. Fund of about $152,000 is being arranged for this and sewage system, with Federal financing for part of amount. Burleson & Garrett, Grand Prairie, are consulting engineers.

Waynesville, Mo., has completed financing through Federal aid for pipe lines for water system and other waterworks installation, and will begin work soon. Cost about $108,000.

New London, Conn., has received a $105,000 PWA grant and has preliminary plans for a $350,000 revamping of its entire water system.

● **Board of Water and Sewage Commissioners,** Stevens Point, Wis., asks bids until Oct. 13 for 1000 ft. of 6-in., 3000 ft. of 2-in., and 2000 ft. of 1½-in. bell and spigot pipe for extensions in water system.

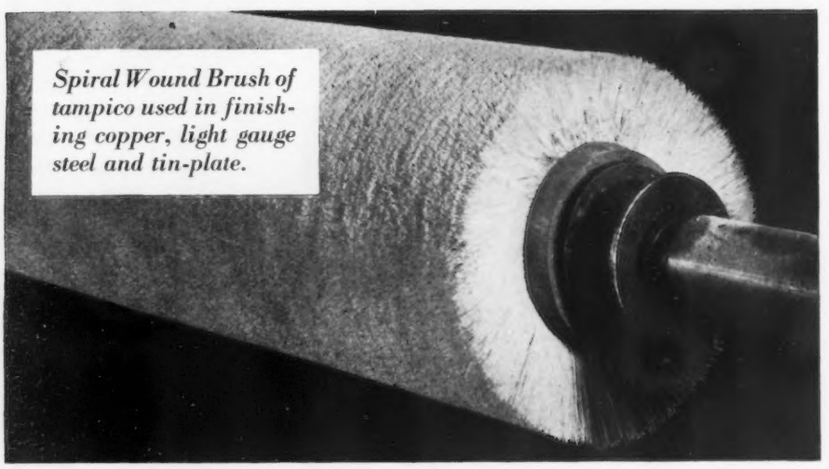
Charlotte, N. C., plans pipe line extensions in water system and other waterworks installation. Cost about $50,000. Bond issue has been authorized in that amount.

Jacksonville, Ark., plans water pipe line system and other waterworks installation. Fund of about $288,800 is being arranged through Federal aid for this and sewage system.

Beaufort, S. C., plans pipe line extensions and replacements in water system, including elevated steel tank and tower, and pumping machinery. Cost about $53,360. Fund in that amount has been arranged through Federal aid.

Fairfield, Mont., plans pipe lines for water system and other waterworks installation. Cost about $65,000. John W. Hall, Fort Shaw, Mont., is consulting engineer.

SPIRAL WOUND BRUSHES Built to Your Order



Spiral Wound Brush of tampico used in finishing copper, light gauge steel and tin-plate.

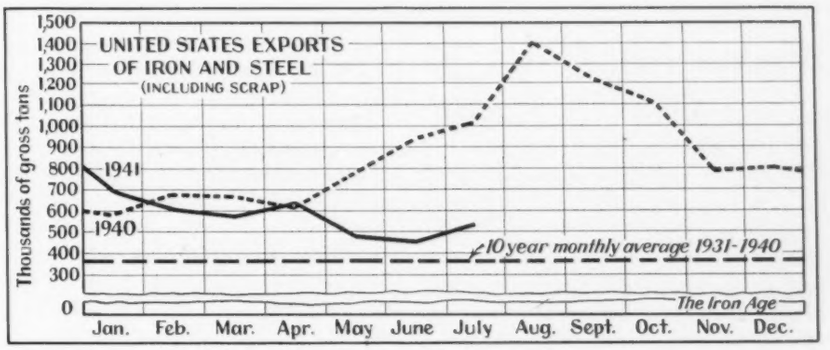
● Consult with our engineering representatives. They will gladly work with you in developing Spiral Wound Brushes, of wire, horsehair or tampico, to meet your particular finishing requirements.

"Pittsburgh" Spiral Wound Brushes pay for themselves—many times over!—in the time and money they save. Write or telephone for further information.

PITTSBURGH
PLATE GLASS COMPANY
Brush Division · Baltimore, Md.
WAREHOUSES IN 81 IMPORTANT MARKET AREAS

July Steel Exports Gain to 537,921 Tons

• • • **Exports of iron** and steel products, including scrap, rose to 537,921 tons in July from 457,685 tons in the preceding month, according to the Department of Commerce. Chief gains were shown in pig iron and semi-finished shipments. Scrap steel deliveries were practically unchanged from the June level. Exports in July, 1941, were 1,034,938 tons, or 497,017 tons above this year's shipments, with the difference being due largely to the greatly reduced volume of scrap steel exports this year.



IMPORTS
(*Gross Tons*)

July		Seven Months Ended July			EXPORTS (*Gross Tons*) July		Seven Months Ended July	
1941	1940	1941	1940		1941	1940	1941	1940
....	1,067	....	6,842	Pig iron	63,057	70,790	367,281	200,126
....	981	2,937	17,426	Ferromanganese and spiegeleisen[1]	109	150	2,437	10,247
369	103	2,274	767	Ferrochrome and ferrosilicon[1]	*	.....	.....	.....
....	25	....	215	Other ferroalloys[1]	594	2,552	13,755	8,409
....	....	....	23	609 Sponge iron	*	.....	.....	.....
9,418	152	26,311	1,412	Scrap: iron, steel, tin plate	59,905	327,129	475,785	1,805,935
9,787	*2,328*	*31,545*	*27,271*	*Pig iron, ferroalloys and scrap*	*123,665*	*400,621*	*859,258*	*2,024,717*
....	....	57	440	Ingots, blooms, billets, sheet bars	115,778	273,862	747,498	893,982
*	....	....	....	Ingots, etc.: stainless, other alloy	17,901	4,772	247,841	22,980
*	....	....	....	Skelp	8,860	13,012	91,915	44,433
....	18	105	3,944	Wire rods	14,310	21,162	76,487	123,578
....	*18*	*162*	*4,384*	*Semi-finished steel*	*156,849*	*312,808*	*1,163,741*	*1,084,973*
....	13	44	102	Sheets, black iron and steel[2]	38,962	43,574	241,959	286,751
*	....	....	....	Sheets, galvanized iron and steel	7,392	14,588	62,449	102,948
*	....	....	....	Sheets, alloy steel	857	31	7,292	3,599
*	....	....	....	Sheets, stainless	116	87	659	1,069
1	2	9	9	Plates, plain and fabricated	24,345	35,362	242,133	261,993
*	....	....	....	Plates, alloy	2,492	176	5,626	1,525
*	....	....	....	Plates, stainless	6	29	169	265
40	26	204	1,752	Bars, merchant and reinforcing	29,259	50,399	286,693	331,529
....	....	15	194	Bars, iron[3]	399	1,324	2,229	3,686
*	....	....	....	Bars, alloy steel	5,471	1,727	45,071	16,354
*	....	....	....	Bars, stainless	65	19	377	569
....	27	153	844	Bars, hollow steel	*	.....	.....	.....
....	11	....	612	Hoops, bands, strips, cotton ties	15,025	17,837	88,295	105,565
*	....	....	....	Hoops, bands, strip: alloy steel	71	77	864	577
*	....	....	....	Hoops, bands, strip: stainless	36	78	296	442
*	....	....	....	Piling, sheet	378	1,673	4,089	8,543
3	4	52	691	Structural shapes	18,479	24,527	160,125	131,222
31	..	181	16	Structural material, fabricated[4]	3,778	4,509	33,255	44,139
9	15	69	72	Tin plate, terne plate, taggers' tin	23,974	30,447	137,986	298,124
*	....	....	....	Tanks, steel	1,355	2,082	13,228	16,276
....	31	....	31	Pipe, welded iron and steel	9,529	11,517	83,355	65,178
96	151	668	2,159	Casing and oil line pipe	16,523	14,353	84,318	115,108
*	....	....	....	Boiler tubes	6,202	2,135	33,603	13,609
....	20	28	806	Wire, round iron and steel, telephone	5,474	8,204	39,426	51,371
4	41	92	467	Wire rope, strand, other products	1,181	1,292	9,749	6,922
....	42	....	86	Wire barbed, woven products	3,879	4,086	38,700	23,423
163	256	1,680	1,613	Wire flat, all other types	7,544	12,263	69,277	76,272
1	1	22	104	Nails, tacks and staples	881	972	6,315	4,356
4	3	26	127	Bolts, nuts, rivets, washers, etc.	3,407	2,192	23,933	10,108
884	531	3,507	1,416	Rails and track material	18,073	18,170	114,712	87,071
2	....	8	12	Die blocks or blanks, etc.	*	.....	.....	.....
....	....	....	3	All other finished steel	1,724	2,314	18,811	12,656
1,238	*1,174*	*6,758*	*11,116*	*Rolled and finished steel*	*246,877*	*306,044*	*1,854,994*	*2,087,250*
....	....	....	419	Cast iron pipe and fittings	2,926	11,318	35,774	47,451
....	....	....	2	Malleable iron pipe fittings	351	317	2,884	2,655
24	22	185	398	Casting, forgings: iron and steel	4,340	2,872	35,593	18,867
*	....	....	....	Castings, forgings: alloy and stainless	409	242	4,364	3,445
*	....	....	....	Carwheels and axles	2,504	716	13,861	9,329
24	*22*	*185*	*819*	*Castings and forgings*	*10,530*	*15,465*	*92,476*	*81,747*
11,049	3,542	38,650	43,590	Total	537,921	1,034,938	3,970,469	5,278,687

[1] In imports the tonnage shown is the alloy content: the manganese, chromium and silicon content, as the case may be. [2] Imports include skelp and saw plate. [3] Import figure included iron slabs. [4] Imports include sashes and frames only.
* No separate figures.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Machine Tool Price Ceiling Is Studied

Washington

• • • **OPM Director** General William S. Knudsen has asked members of the National Machine Tool Builders Association to work critical tools seven days a week, increase where possible man-hours on night shifts, and develop subcontracting to the greatest possible extent. At the same time Price Administrator Leon Henderson has called a meeting for Oct. 22 to discuss with members of the industry a proposed schedule of maximum prices on new machine tools.

In a letter directed to Frederick V. Geier, president of the association, Mr. Knudsen said that large tools are the most critical and called upon the industry to make a further contribution to the defense program by increasing the work week and engaging in more sub-contracting.

Formulation of a price schedule for new machine tools has been under consideration by Mr. Henderson's staff virtually ever since a price ceiling was fixed for used machine tools last February. The latest announcement from Mr. Henderson's office on the subject merely said that "consideration is being given" to the issuance of such a price schedule.

Tank Plants Make Heavy Machine Tool Purchases

Cleveland

• • • **Within the** past week there has been particularly heavy buying of lathes, drilling machines and other equipment, primarily for the construction of tanks at Detroit plants. The major buyers are reported to be Nash-Kelvinator, Chrysler and Ford. Meanwhile, orders for machine shop equipment for the Ravenna Ordnance plant have been particularly heavy during the past few weeks. Equipment includes lathes, pellet press machines, measuring equipment and other items.

The unusual aspect of buying for the Ravenna plant has been that purchases are being made at least through five different mediums. Originally, Atlas Powder, which is to manage the plant upon its completion, purchased most of the necessary equipment but since then Wilbur Watson Associates, Hunkin-Conkey Construction Co., the Piccatinny Arsenal and the U. S. Government itself have all become purchasing agents for the shell loading plant. Furthermore, machinery to process certain chemicals is being purchased through Gillmore-Carmichael & Olson.

The priorities situation continues confused and producers remain upset by constantly changing of the priority position of orders to be shipped. A recent example is one instance where several boring mills had been promised to a customer with an A-1-A rating for November, but these were diverted elsewhere instead by the O.P.M. This will result in the customer's delivery being delayed to next February.

September Gear Sales Show Small Decline

• • • **Industrial gear** sales declined slightly in September, but were still substantially above the level of September, 1940, the American Gear Manufacturers Association reports. The index of sales compiled by the association stood at 243 in September, as compared with 276 in August and 183 in September, a year ago. The highest index recorded was 299, reported for June of this year. Average index for the first nine months of the current year is 277, against 140 in the comparable period of a year ago. The association's index does not include automotive gears or high speed turbine drive gears.

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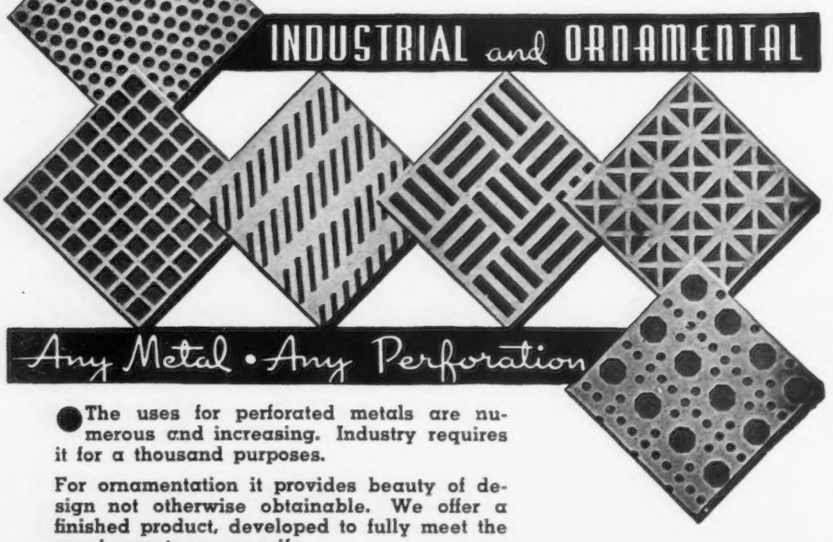

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NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Zinc Prices Are Advanced by OPA

• • • **For the first time** since the establishment of price schedules and price ceilings, OPA has permitted an upward adjustment of prices. In last Thursday's revision of the informal zinc price schedule, agreed upon by producers in October, 1940, an increase of 1c. per lb. was permitted. The new price schedule establishes a maximum of 8.25c. a lb. for Prime Western zinc, f.o.b. East St. Louis, and 9.25c. a lb. delivered basis for High Grade zinc, up 1c. a lb. from the original price ceiling. Such adjustments permit increases up to 3c. a lb. on zinc products.

OPA claims that this price increase "is necessary to maintain and expand supply," and is aimed primarily at utilizing lower grade ores and opening new mines. OPM expects the price increase to stimulate production enough to take care of all existing defense and essential civilian demands.

Such action by OPA may be the beginning of a study of the price structures for other commodities, with resulting price adjustments for lead, copper, tin and other metals. Because the lead and zinc industries are closely allied, with many underlying production factors being the same in both industries, lead producers are hoping that a similar price increase may be in the wind for their products, raising the prices to perhaps 6.50 to 7c. a lb. However, while it seems now that hope for such action on the lead price ceiling is a little premature, it is believed that a price increase for lead may be instrumental in getting greater domestic mine production.

Extensive revisions of the copper scrap price schedule, placing prices on a shipping point instead of a delivered basis, allowing quantity differentials to dealers, and establishing premiums for briquetting and other special services were announced this week by OPA. While prices themselves were unchanged for copper scrap, they are now based at the point of shipment, permitting the addition of transportation costs to the buyer's plant, instead of being delivered prices. Furthermore, no special margin is stipulated for dealer's services. Dealers may charge a premium of 0.5c. a lb. for shipments of 40,000 lb. or more at one time, except in the case of scrap in crucible shape. Delivery "at one time" may include all deliveries made to a buyer within 48 consecutive hours.

A premium of 1.25c. a lb. may be charged for scrap sold in the form of briquettes or in lengths not exceeding 16 in., cut or bundled. Also, upon application to OPA, a special premium above the ceiling price may be allowed for copper wire scrap especially prepared and selected for use in the production of copper sulphate or other chemicals, copper powder, or for use by steel mills, iron foundries, aluminum smelters, etc.

Copper scrap that is a by-product of the fabrication of copper sheet, tube, rod or other brass mill products is no longer covered by the copper scrap schedule, but is included in Price Schedule No. 12, for brass mill scrap.

Average prices of the major non-ferrous metals in September, based on quotations appearing in THE IRON AGE, were as follows:

	Cents per Lb.
Electro copper, Conn. Valley	12.00
Lake copper, East., delivery	12.00
Straits tin, spot, New York	52.00
Zinc, East St. Louis	7.25
Zinc, New York	7.65
Lead, St. Louis	5.70
Lead, New York	5.85

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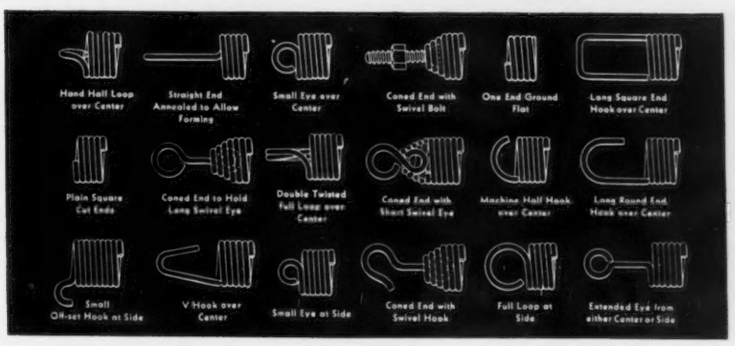
Hand Half Loop over Center
Straight End Annealed to Allow Forming
Small Eye over Center
Coned End with Swivel Bolt
One End Ground Flat
Long Square End Hook over Center
Plain Square Cut Ends
Coned End to Hold Long Swivel Eye
Double Twisted Full Loop over Center
Coned End with Short Swivel Eye
Machine Half Hook over Center
Long Round End Hook over Center
Small Off-set Hook at Side
V Hook over Center
Small Eye at Side
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SCRAP

Iron, Steel Scrap Put Under Full Priority Control

Washington

• • • **Because of an** "increasingly unsatisfactory" flow of iron and steel scrap to defense industries, the OPM last week established full priority control over scrap in General Preference Order M-24. Issuance of the order followed an announcement, made some three weeks ago, that the shortage of supplies would force the agency to establish full control to assure adequate supplies for defense plants.

It was explained that the action authorizes OPM to issue specific directions for deliveries of scrap. The order became effective Oct. 11 and requires producers, dealers, brokers, and consumers of iron and steel scrap to make monthly reports to the priorities division.

Starting Nov. 15, the order provides, producers must report scrap inventories, production and sales; brokers must show inventories, purchase, and sales; and consumers must indicate inventories, production, receipts, and consumption of scrap metal. From these reports, OPM is expected to draw up a general policy for the distribution of scrap under mandatory orders. Forms of reports with complete instructions will be furnished shortly.

"The provisions and controls of Priorities Regulation No. 1 are specifically extended to the iron and steel scrap industry," OPM said. Intra-company deliveries are subject to the same requirements that apply to inter-company deliveries.

Full text of General Preference Order M-24, imposing a mandatory priorities system on iron and steel scrap follows:

General Preference Order No. M-24

Whereas, the national defense requirements have created a shortage of iron and steel scrap for defense, for private account, and for export, and it is necessary in the public interest and to promote the defense of the United States to conserve the supply and direct the distribution thereof.

NOW, THEREFORE, IT IS HEREBY ORDERED:

965.1 General Preference Order. (a) Priority Control. All the provisions and definitions of Priorities Regulation No. 1, issued by the Director of Priorities on Aug. 27, 1941 (Part 944), as amended from time to time, are hereby included as a part of this Order with the same effect as if specifically set forth herein, except as otherwise specifically provided herein.

(b) Additional Definitions. For the purposes of this Order:

(1) "Scrap" means "all ferrous materials, either alloyed or unalloyed, of which iron or steel is a principal component, which are the waste of industrial fabrication, or objects that have been discarded on account of obsolescence, failure or other reason."

(2) "Producer" means any person who produces Scrap in the conduct of a business or other enterprise.

(3) "Dealer" and/or "Broker" means any person who, as principal or as agent, buys and sells Scrap in the regular course of his business.

(4) "Consumer" means any person who uses Scrap in the production of iron, steel or ferro-alloy material or products.

(c) Provisions relating to Producers. On or before the 15th day of each month, beginning Nov. 15, 1941, Producers who have during the preceding month produced 20 gross tons or more of Scrap shall file reports as prescribed by the Director of Priorities showing Scrap inventory, production and sales, and such other information as the Director may from time to time require.

(d) Provisions relating to Dealers and Brokers. On or before the 15th day of each month, beginning Nov. 15, 1941, Dealers and Brokers shall file reports as prescribed by the Director of Priorities, showing Scrap inventory, purchases and sales, and such other information as the Director may from time to time require.

(e) Provisions relating to Consumers. On or before the 15th day of each month, beginning Nov. 15, 1941, Consumers shall file reports as prescribed by the Director of Priorities, showing Scrap inventory, production, receipts and consumption, and such other information as the Director may from time to time require.

(f) Special Instructions. The Director of Priorities may from time to time issue specific directions to any person as to the source, destination, or amount of Scrap to be delivered or acquired by such person.

(g) Violations. Any person affected by this Order who falsifies records or reports which he is required by this Order to keep or file, or who violates any other provision of this Order or any other Order, regulation, or other directive issued by the Office of Production Management may be prohibited by the Director of Priorities from making or receiving deliveries of Scrap, or may be subjected to such other or further action as the Director may deem appropriate.

(h) Effective Dates. This Order shall take effect immediately, and, unless sooner terminated by direction of the Director of Priorities, shall expire on the 30th day of June, 1942.

(Signed) Donald M. Nelson,
Director of Priorities.

Plan Scrap Bundling Plant

• • • **The newly organized** Illinois-Missouri Scrap Steel Baling Co., 610 Hayden Street, Ft. Wayne, Ind., is planning to erect a new scrap bundling plant, including a hydraulic press, in East St. Louis. The new plant, which has been given preference ratings to speed delivery of required machinery and equipment, is expected to be in operation by Dec. 1. Frank G. Tuschman of Indiana Scrap & Baling Co., Fort Wayne, Ind., will be in charge of the new plant.

OPA Acts to Spur Imports; New Rail Basing Point Announced

Washington

• • • **In an effort to** bring in supplies from Cuba, Mexico and Central and South America, the OPA has granted authority to steel plants and foundries to import iron and steel scrap from any foreign source at prices exceeding the established maximums.

Simultaneously, OPA issued an amendment to the scrap schedule establishing Cincinnati as a basing point for scrap of railroad origin and fixing a price of $20.50 a ton for No. 1 railroad heavy melting steel. The amendment became effective Oct. 10. This action places railroads in the Cincinnati area on a parity with sellers of industrial scrap, and is taken merely to mean correction of an omission when the scrap schedule was issued.

In permitting scrap imports at prices above the ceiling, OPA said that buyers first must apply to OPA, furnishing complete details of the proposed transaction. If authority is given and the scrap brought in, the buyer then must supply OPA with certified copies of the bills of lading.

The lifting of the ceiling on imports is supplementary to OPA's recent order permitting higher prices for scrap in the Western remote area, and was attributed to the acute shortage of old material.

The prices per gross ton fixed for railroad scrap at Cincinnati follows: No. 1 heavy melting steel, $20.50; scrap rails, $21.50; rails for rerolling, $23; scrap rails, 3 ft. and under, $23.50; scrap rails, 2 ft. and under, $27.75; scrap rails, 18 in. and under, $24.

Record Keeping Begins on All Scrap Transactions

• • • **Outside of the fact** brokers, producers and consumers have begun keeping records on all iron and steel scrap transactions, otherwise General Preference Order M-24, directing the distribution of scrap, had not created much change in the general picture early this week. Material was just as scarce as ever.

Considerable difficulty will be encountered in making the allocation order effective. The move will not increase the supply of scrap in any way, but may work to the advantage of some steel producing plants engaged in a high percentage of national defense work.

The first direct action to enforce the scrap ceiling price order has been taken by OPA, which compelled "one of the country's iron and steel scrap dealers and largest brokers" to refund to buyers all amounts collected in excess of the established ceilings in respect to every such sale made since Sept. 2.

At Pittsburgh, market conditions generally are unchanged and mills are still in a tight position on supplies. At Detroit there was hope that perhaps the exercise of priorities would remove the threat of a shutdown facing some open hearth operators. Cincinnati reports receipt of southern scrap enabled the resumption of an open hearth at Ashland, Ky., where two of the eight units are still down.

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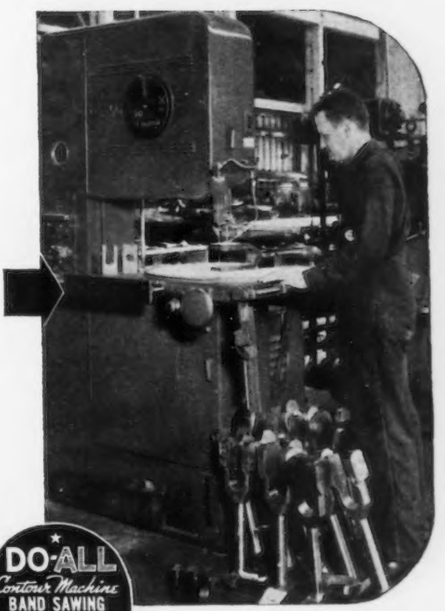
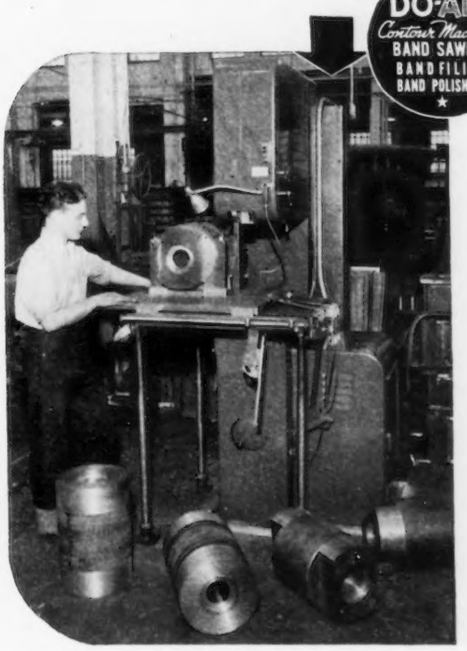
1/3 FORMER TIME

Wrist pins for Diesel Engines made from 45 carbon steel in 2 hours, 48 minutes each at Norberg Mfg. Co., Milwaukee, Wis. Former time—8 hours of milling.





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Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPA to Sept. 26, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points ➤ / ▼ GRADES	Pittsburgh	Johnstown, Wilerton, Steubenville, Youngstown, Warren, Sharon, Canton	Chicago	Kokomo	Bethlehem	Claymont, Coatesville, Phoenixville, Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	Cincinnati*, Portsmouth, Middletown, Ashland	St. Louis	Detroit	Duluth, Minneapolis**	Birmingham	Chattanooga	Radford, Va.	Worcester, Bridgeport, Phillipsdale, R. I.	Los Angeles, San Francisco, Seattle, Portland	Minneque, Colo.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.25	$18.75	$18.75	$19.25	$19.50	.....	$19.50	$17.50	$17.85	$18.00	$17.00	.....	.....	.....	14.50	16.50
No. 1 hyd. comp. black sheet	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	(See	13.50	15.50
Dealers' No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	foot-	13.50	15.50
Dealers' No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	notes)	12.50	14.50
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	.....	12.25	.....	.....	.....	9.75	11.75
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	Alloy, ...	W.Va., 17.60	.....	10.00	12.00
Shoveling turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	.....	.....	.....	.....	11.00	13.00
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.00	.....	.....	.....	14.00	16.00
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	10.00	12.00
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	[6]15.25	13.25	13.60	13.75	12.75	.....	.....	.....	10.25	12.25
Uncut structural, plate scrap	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	18.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	*19.00	20.00	20.50	21.00	22.00	18.00	.....
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	*17.50	18.50	.....	.....	20.50	17.00	.....
Stove plate	19.00	[5]19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	*16.00	17.00	17.50	18.00	17.50	14.00	.....
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	19.50	.....
Low phos. bar crops, smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	19.50	.....
Low phos. pu'ch'gs., plate scrap[1]	24.75	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	17.50	.....
Machinery cast, cupola size[2]	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	*20.00	21.00	21.50	22.00	23.00	19.00	.....
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	.....
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	.....
Punchings and plate scrap[3]	23.75	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20 00	19.00	.....	.....	.....	16.50	.....
Punchings and plate scrap[4]	22.75	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	15.50	.....
Heavy axle, forge turnings	21.25	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	14.00	.....
Medium h'vy. el. f'ce. turnings	19.75	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	12.50	.....

[1] This grade is ⅜-in. and heavier, cut 12 in. and under. [2] May include clean agricultural cast. [3] Under ⅜ to ¼-in., cut 12 in. and under. [4] Under ¼-in. to No. 12 gage, cut 12 in. and under. [5] Youngstown, Warren, Sharon and Canton are not basing points on this grade. [6] Middletown and Cincinnati price for this grade is $15. * Includes Newport, Ky. Shipping point price within Cincinnati basing point may be 80c. a ton below basing point price listed above for all grades except the six cast grades. ** Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

Railroad Scrap *(Per gross ton, delivered consumers' plants located on line of railroad originating scrap)*

Basing Points ➤ / ▼ GRADES	Pittsburgh, Sharon, Pa., Wheeling, Steubenville, Youngstown, Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth, Middletown, Ashland	St. Louis	Kansas City	Cincinnati	Detroit	Duluth	Birmingham	Los Angeles, San Francisco, Seattle
No. 1 heavy melting	$21.00	$19.75	$19.25	$19.75	$19.75	$19.75	$20.50	$20.25	$20.50	$18.50	$17.00	$20.50	$18.85	$19.00	$18.00	$15.50
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	21.50	19.85	20.00	19.00	16.50
Rerolling rails	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	23.00	21.35	21.50	20.50	18.00
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	23.50	21.85	22.00	21.00	18.50
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	27.75	22.10	22.25	21.25	18.75
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	24.00	22.35	22.50	21.50	19.00

Railroads not operating in a basing point may sell rerolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Rerolling mills may absorb all transportation charges necessary to obtain such rails. Maximum prices for scrap rails and rerolling rails from mines, logging camps and similar sources need not be sold for less than $13.50 a gross ton for scrap rails and $15 for rerolling material at shipping point.

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than $1 prices (for material other than railroad scrap) for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which the scrap is to be shipped to a consumer. A shipping point price is computed as follows: (a) For Shipping Points located within a basing point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For shipping points located outside a basing point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Deduct from this the lowest established charge for transporting scrap from the shipping point to such basing point. *Exceptions:* (1) The shipping point price at any shipping point in New England, of those grades of scrap for which no prices are listed above shall be the Johnstown basing point price, minus the all-rail transportation costs from the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

GULF PORT PRICES: Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding $14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

REMOTE SCRAP: Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas and Oklahoma. Maximum shipping point price of remote scrap is $12 a gross ton, for No. 2 heavy melting steel, with differentials for other grades the same as differentials established in table above for St. Louis. The maximum delivered price of remote scrap is the shipping point price, plus actual transportation charges, except that when necessary to absorb transportation charges, the maximum delivered price may be exceeded by a maximum of $4 a ton. Thus the maximum delivered price for remote scrap may exceed the price for the nearest basing point by $5. In the event that an allowance in excess of $5 a ton is necessary to acquire a tonnage of remote scrap, a consumer may apply to OPA for permission to exceed the $5 allowance. Purchases under these remote scrap provisions must be for not less than one car a month and must be reported in detail. Provisions of this remote scrap section expire Dec. 31, 1941.

BROKER COMMISSIONS: A commission of up to 50c. a ton above the maximum prices is allowed to brokers.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is $2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than $2.50 in transportation charges. Lowest established transportation charges will govern.

Non-Ferrous Scrap

(Dealers buying prices, cents per lb.)

	New York	Philadelphia	Pittsburgh	Cleveland	Detroit	Chicago
No. 1 hvy. copper	*10.00	*10.00	*10.00	*10.00	*10.00	*10.00
Light copper	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00
Hvy. yel. brass	6.25 6.50	**6.25	7.50 8.00	5.75 6.25	7.00 7.25	7.50
Light brass	5.25 5.50	**5.50	7.00 7.25	6.00 6.50	6.50 6.75	7.00 7.25
No. 1 Comp. turn.	8.75 9.00	**7.75	**9.00 9.25	8.50 9.00	9.00 9.25	9.00 9.25
New brass clips	8.00 8.25	8.50 9.00	7.75 8.00	8.00 8.50	7.50 8.00	7.75 8.25
Soft lead	5.25 5.50	5.00 5.25	4.75 5.00	4.75 5.00	5.00 5.25	4.75 5.00
Old zinc	4.00 4.25	4.25	4.25 4.50	4.00 4.50	4.25 4.50	4.50 5.00
Cast, forged alum.	*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
Old sheet alum.	*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
Solder joints	8.75 9.00	9.00	7.50 8.00	6.50 6.75	5.50 6.00	7.50 8.00
No. 1 pewter	35.00 36.00	35.00 36.00	31.00 32.00	32.50 34.00	37.50 38.50	32.00 34.00

* OPA maximum for sale by dealer. ** Nominal.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

	Oct. 14, 1941	Oct. 7, 1941	Sept. 16, 1941	Oct. 15, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Oct. 14, 1941	Oct. 7, 1941	Sept. 16, 1941	Oct. 15, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Ferromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp sheet, Det.	17.85	17.85	17.85	18.50
Low, phos. plate, Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh	22.00	22.00	22.00	20.25
No. 1 cast, Philadelphia	24.00	24.00	24.00	22.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	17.75

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$4.75
Foundry coke, prompt	6.875	6.875	6.875	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	51.875
Zinc, East St. Louis	8.25	7.25	7.25	7.25
Lead, St. Louis	5.70	5.70	5.70	5.10
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in detailed price tables, pages 100-104.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Oct. 14, 1941	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$22.61 a Gross Ton	$20.67 a Gross Ton

	High	Low	High	Low	High	Low
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.90¢	3.16¢	
Coopperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10						$5.32
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			3.37¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.80¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS															
Common		2.25¢			(Terre Haute, Ind. =2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

	Per Gross Ton
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem	$54.00

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal	
Boston	$25.50	$25.00	$26.50	$26.00	.....	.....	
Brooklyn	27.50	.....	.....	28.00	.....	.....	
Jersey City	26.53	26.03	27.53	27.03	.....	.....	
Philadelphia	25.84	25.34	26.84	26.34	.....	.....	
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....	
Everett, Mass.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....	
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....	
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....	
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....	
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....	
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....	
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....	
Cincinnati	24.44	24.61	.....	25.11	.....	.....	
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....	
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....	
St. Louis	24.50	24.02	.....	.....	.....	.....	
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....	
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....	
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**	
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**	
St. Paul	26.63	.....	27.13	26.63	.....	.....	
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....	
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....	
Los Angeles	27.50	.....	.....	.....	.....	.....	
San Francisco	27.50	.....	.....	.....	.....	.....	
Seattle	27.50	.....	.....	.....	.....	.....	
Provo, Utah	**22.00**	.....	.....	.....	.....	.....	
Montreal	27.50	27.50	.....	28.00	.....	.....	
Toronto	25.50	25.50	.....	26.00	.....	.....	

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3 25	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$5.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	....
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.50	....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.63	....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43. **Over 4 in. wide and over 1 in. thick, $4.95.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6 ½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price = $200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.

ZINC IN DEFENSE-

NO. 1 OF A SERIES

HULL PLATES

RUBBER

BRASS

PAINT

DIE CASTING

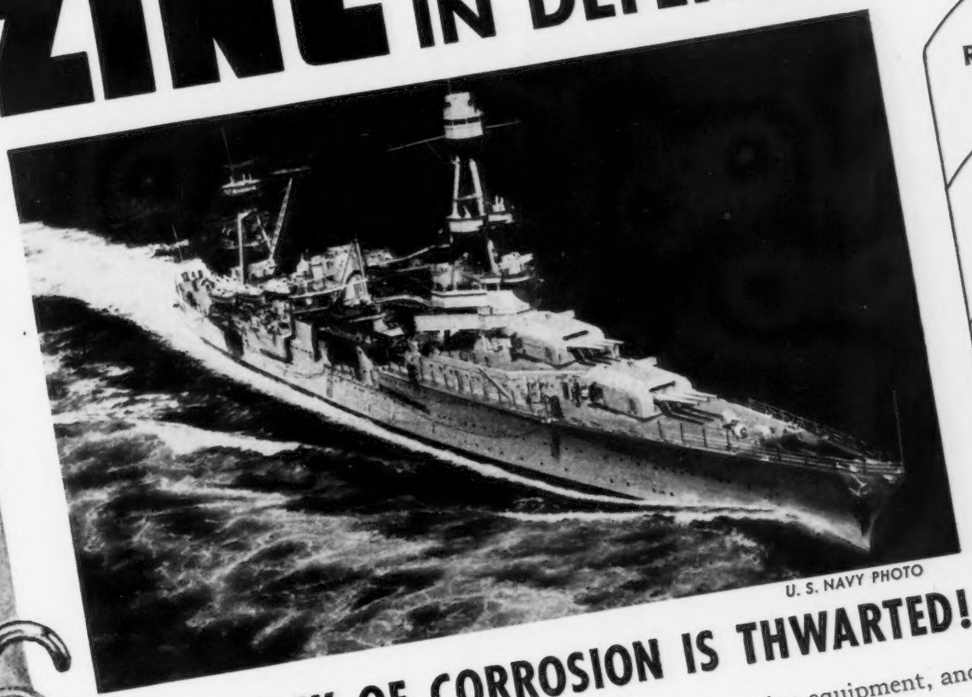
CERAMICS

METAL SPRAYING

GALVAN-IZING

PHARMA-CEUTICALS

NICKEL SILVER



U. S. NAVY PHOTO

AN ATTACK OF CORROSION IS THWARTED!

Most persons do not think of zinc in connection with marine equipment, and yet the United States Navy, as well as independent ship operators, rely on zinc plates to retard the costly corrosion of hulls, boilers and condensers—on vessels which are, today, vital to National Defense.

Because of its relative position in the electrochemical series, zinc in contact with steel in the presence of water will gradually be dissolved, protecting the surrounding area from corrosion. For this reason, it has become common practice to bolt zinc plates directly to the exterior of ships' hulls to provide sacrificial corrosion and save the steel. (Zinc's method of protecting steel by galvanizing involves a similar principle).

The Defense Program requires the employment of all available shipping and the construction of new tonnage in record volume, thereby greatly multiplying the normal needs for hull plates. This use for zinc is typical of the way in which the metal is serving defense without commanding widespread attention.

Actually, the uses of zinc today are no different from those in normal times, but the increased demand on each of the many uses having a part in defense pyramids the load for the zinc industry. Thus it is that manufacturers of non-defense products have not been able to obtain all of the zinc they would like to use. This is part of the price that must be paid for national security.

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS ... HORSE HEAD LINE OF PRODUCTS

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)...$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Silvery Iron

(Per Gross Tons, base 6.00 to 6.50 Si

F.O.B. Jackson, Ohio $29.50*
Buffalo $30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

* Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon .....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less $2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equalized with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsato (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Washington, Pa. ..... 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... $4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn..65c. to 66c.
African, Indian, 49-51 Mn..67c. to 69c.
Brazilian, 46-48 Mn .....69c.
Cuban, del'd, 51 Mn .....78c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade).....Nom.
Rhodesian, 45 .....$32.00
Rhodesian, 48 .....$39.00-$40.00

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace *Per Net Ton*

Connellsville, prompt ...$6.00 to $6.25

Foundry

Connellsville, prompt ...$6.75 to $7.00

* Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. † F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.$10.75 to $11.00
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton $40.00
Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast ..... 2.30c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$22.00 to $23.00
Domestic, f.o.b. Ohio River landing barges ..... 22.00 to 23.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..22.00 to 23.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.... 31.00
As above, in bags, f.o.b. same mines 32.60

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois 46.55
Second quality, New Jersey 51.00
No. 1, Ohio 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

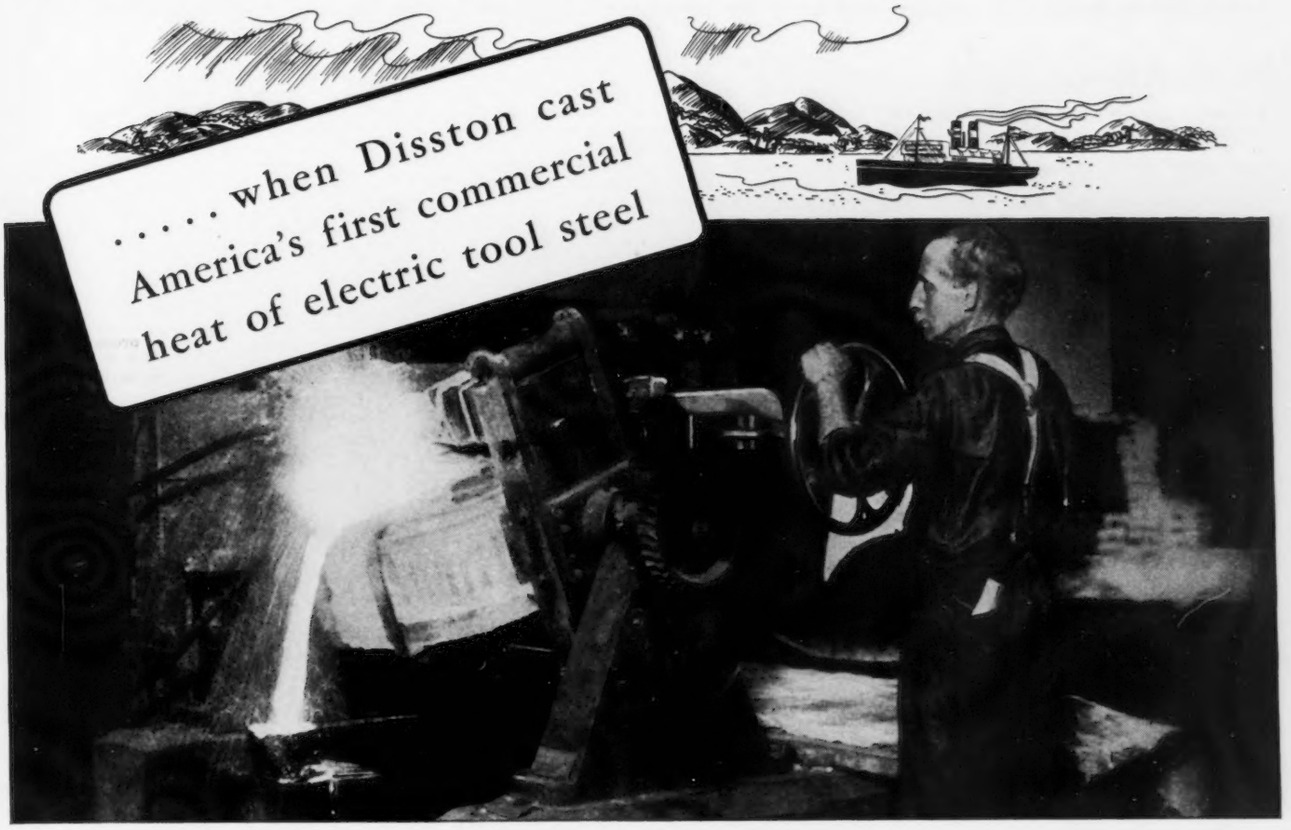
Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks $44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

Goethals hadn't reached Panama



A group of eager metallurgists gathered around a small, crude electric furnace in 1906. A workman turned a wheel, the furnace poured out white-hot metal . . . the first commercial heat of electric tool steel cast in America . . . made by Disston.

Today, Disston's pioneering in the manufacture of high grade steels continues. And today's metallurgical controls are so precise that electric steel properties have been vastly improved. Alloys of seven or eight elements can be added and controlled within close limits at the Disston Steel Works . . . grain size is pre-determined . . . greater soundness and cleanliness are achieved.

So Disston has been able to produce such superior tool steels as Croloy . . . highly resistant to both sliding and impinging wear, with good air hardening qualities . . . *proved* excellent for dies, punches and many high-production tools.

Help for tool makers: Disston engineers and metallurgists will be glad to help you in selecting the best tool steels for each job . . . to get more "mileage" per tool. Also, there's valuable information in the illustrated 73-page catalog, "Disston Tool Steels." If you haven't received your copy, write today to Henry Disston & Sons, Inc., 1019 Tacony, Philadelphia, Pa.

Croloy earns blue ribbons the hard way

Croloy, produced under U. S. Patent 1,695,916, is a chromium-vanadium-molybdenum alloy steel which has won "blue ribbons" in the Disston plants and elsewhere during many long production runs . . . in such applications as punches, dies, swaging mandrels, gauges, shear blades, wearing parts, slitting cutters and planer knives. Croloy is readily air hardened and is outstanding for its high resistance to both sliding and impinging wear.

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DISSTON TOOL STEELS

SALES POSSIBILITIES

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

● **General Electric Co.,** Lynn, Mass., has filed plans for one-story addition, 61 x 198 ft., to be known as building No. 66. Cost over $65,000 with equipment.

Scovill Mfg. Co., Waterbury, Mass., brass, bronze, copper and other metal products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition, about 40 x 182 ft. Cost close to $70,000 with equipment.

Lynn Gas & Electric Co., Exchange Street, Lynn, Mass., has approved plans for expansion in steam-electric power station, including two new turbine-generator units and auxiliary equipment. Large part of increased output will be used at reduction gear works for Government production, now in course of erection by General Electric Co. Power station extensions will cost over $1,700,000.

Bureau of Yards and Docks, Navy Department, Washington, has authorized two buildings at submarine base, Groton, Conn., four stories, 64 x 224 ft., and two stories, same size, for equipment storage and distribution. Cost over $400,000 with equipment. E. L. Scholfield, 309 State Street, New London, Conn., is architect.

Watertown Mfg. Co., Echo Lake Road, Watertown, Conn., plastic products, has let general contract to Robert L. Vaill & Co., 56 Echo Lake Road, for two-story addition. Cost close to $50,000 with equipment.

Pratt & Whitney Division, United Aircraft Corp., East Hartford, Conn., will begin installation of equipment in additional plant unit, recently completed, totaling about 500,000 sq. ft. of floor space, requiring from 60 to 90 days for completion. Entire project will cost close to $2,000,000. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Phelps-Dodge Corp., 40 Wall Street, New York, has contracted with government for new plant at its copper properties at Morenci, Ariz., comprising one and multi-story units for raw material handling, reduction division, refinery, storage and distribution. Cost about $28,000,000, fund in that amount to be furnished by Defense Plant Corp., Washington. Company engineering department is at 25 Broadway, New York.

Standard Oil Co. of New Jersey, 26 Broadway, New York, plans one-story addition, about 23 x 70 ft., at oil refinery at Constable Hook, Bayonne, N. J., and improvements in part of present plant. Work will be carried out by company forces. Cost close to $50,000 with equipment.

Refined Syrup Sales Corp., foot of Vark Street, Yonkers, N. Y., occupying part of former plant of Federal Sugar Corp., has arranged for purchase of remainder of property on three-acre adjoining tract, including two 10-story buildings, 58 x 169 ft. and 79 x 81 ft., respectively, and other structures, and will modernize and equip in part for expansion. Certain buildings will be razed for one-story structure for storage and distribution. Cost over $75,000 with equipment, exclusive of price given for property.

Pepsi-Cola Co., 47-51 Thirty-third Street, Long Island City, plans new two-story plant for general production, mechanical-bottling, storage and distribution. Cost over $175,000 with equipment. Harrison, Fouilhoux & Abramovitz, 45 Rockefeller Plaza, New York, are architects.

Crescent Tool Co., Foote Avenue, Jamestown, N. Y., wrenches, pliers, etc., plans one-story addition. Cost close to $60,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

Chevrolet Motor & Axle Division, General Motors Corp., Tonawanda, N. Y., has asked bids on general contract for one-story addition, 314 x 980 ft., for aircraft engine-testing shop, divided into 44 sections. Cost about $3,600,000 with equipment, fund to be secured from Defense Plant Corp., Washington; of amount noted over $1,700,000 will be expended for equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer. This is part of work now being carried out for conversion of works for production of Pratt & Whitney airplane engines for government. Company also is making improvements in plant at 1001 East Delevan Avenue, Buffalo, for similar purpose, for which John W. Cowper Co., Inc., Sidway Building, Buffalo, is general contractor.

American Steel Castings Co., Avenue L and Edwards Street, Newark, N. J., plans one-story addition for expansion in foundry and pattern shop. Cost over $300,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Oct. 20 for drills (Circular 715).

Irvington Smelting & Refining Works, 374 Nye Avenue, Irvington, N. J., has let general contract to Frank D. Trainer & Son, Inc., 16 Smith Street, for one-story addition, about 85 x 110 ft., for storage and distribution. Cost about $45,000 with equipment.

Reynolds Metals Co., Viaduct Terminal Building, South Kearny, N. J., has leased over 14,000 sq. ft. additional space at same location for expansion in storage and distributing department. Space noted heretofore has been occupied by United Color & Pigment Co., Evergreen Avenue, Newark, which has leased about 18,000 sq. ft. in building at 292 Jelliff Avenue, Newark, and will remove to that location.

Watson-Stillman Co., Roselle, N. J., hydraulic machinery, jacks, presses, pumps, etc., will expand plant for production for government. Additional appropriation will be secured through Defense Plant Corp., Washington, over amount of about $214,450 obtained from same agency several months ago.

Heyden Chemical Corp., 50 Union Square, New York, has let general contract to Michael Riesz & Co., 871 King Georges Road, Fords, N. J., for four-story addition to branch plant at Fords, 50 x 61 ft. Cost close to $75,000 with equipment. Company also is expanding branch plant at Garfield, N. J., previously noted. Cost over $50,000 with equipment.

Department of Supplies and Purchases, City Hall Annex, Philadelphia, Charles H. Grakelow, director, asks bids until Oct. 21 for steel bands (Class 584), skid chains (Class 587).

Fleetwings, Inc., Bristol, Pa., airplanes and parts, will carry out further expansion for production for government, for which fund of about $354,000 is being secured through Defense Plant Corp., Washington. Company is completing new plant near present works, for which an appropriation of $2,484,000 was provided by same agency.

Bethlehem Steel Co., Bethlehem, Pa., plans expansion and improvements in power house at mill at Johnstown, Pa., with installation of boilers and other equipment. Cost over $125,000.

Hill-Chase & Co., Trenton and East Ontario Streets, Philadelphia, steel products, has purchased one-story building, about 41,500 sq. ft. of floor space, on Ontario Street for expansion in storage and distributing department.

National Can Corp., 110 East Forty-second Street, New York, has purchased about two acres at Aliquippa, Pa., for new two-story can-manufacturing plant. Cost over $350,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Oct. 22 for seven traveling, revolving jib cranes for Philadelphia and Portsmouth, N. H., Navy Yards; Naval graving dock, San Juan harbor, P. R.; and Naval operating base, San Diego, Cal. (Specification 10499); two wind tunnels at Naval experimental model basin, Carderock, Md. (Specification 10367).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 21 for six motor-driven hydraulic presses (Schedule 8878) for Eastern and Western Navy yards; seven diesel engine-operated locomotives and spare parts for Charleston, S. C., Burns City, Ind., Hawthorne, Nev., and Fallbrook, Cal. (Schedule 8857).

The South

● **Louisiana Shipyards, Inc.,** New Orleans, has asked bids on general contract for two main one-story mechanical shops and bulkhead assembling buildings. Cost over $150,000 with equipment. J. G. White Engineering Corp., Hibernia Bank Building, is engineer.

Kentucky & West Virginia Power Co., Ashland, Ky., plans expansion in steam-electric generating plant at Hazard, Ky., including new 35,000-kw. turbine-generator unit and accessories, high-pressure boiler and auxiliary equipment. Cost close to $4,000,000 including transmission line extensions.

International Agricultural Corp., 61 Broadway, New York, affiliated with Union Potash & Chemical Co., same address, is acquiring tract near Austin, Tex., for proposed magnesium plant for production for government, to be operated in conjunction with company properties at Carlsbad, N. M., recently noted in these columns. Power supply will be secured from hydroelectric generating station of Lower Colorado River Authority, Austin. Of total fund of $12,317,000 to be furnished by Defense Plant Corp., Washington, about $9,157,000 will be used for construction of magnesium mill, and $1,500,000 for site, power transmission line to plant site, power substation and auxiliary facilities. Dolomite ore-extraction plant will be built near Carlsbad, to cost about $1,660,000 with machinery.

War Department, Washington, plans new flying school at city-county airport to be located at Ocala, Fla., including hangars, mechanical shops, school and shop instruction buildings, administration building and other structures. Cost about $2,500,000.

Ingalls Shipbuilding Corp., Pascagoula, Miss., an interest of Ingalls Iron Works Co., Birmingham, has let general contract to Doullut & Erwin, Inc., Interstate Building, New Orleans, for two shipways, with shops and other facilities for increased production. Another award has been made to Perrilliat-Rickey Construction Co., Eve and South Rendon Streets, New Orleans, for one-story administration building. Cost over $600,000.

Farmers' Electric Generating Cooperative Association, Inc., Gilmer, Tex., Samuel Scales, manager, has rejected bids recently received for three gas engine electric generating units for new power plant and will ask new bids soon. Units will use natural gas for operation. Financing in amount of about $250,000 has been arranged through Federal aid for plant. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Southern Aircraft Corp., Garland, Tex., plans new works for production of airplane equipment for government, comprising main one-story unit and auxiliary structures. Cost about $248,000, of which approximately $126,000 will be used for equipment. Fund in gross amount will be secured through Defense Plant Corp., Washington.

Central States

● **Buckeye Traction Ditcher Co.,** Crystal Avenue, Findlay, Ohio, heavy road machinery and parts, plans one-story addition, 65 x 117 ft. Cost over $60,000 with equipment. R. P. Alge, Findlay, is architect.

Champion Machine & Forging Co., 3695 East Seventy-eighth Street, Cleveland, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for two one-story additions, 95 x 400 ft., for forge and hammer

COMPARISONS ARE OBVIOUS!

Tensile load capacities in above illustration on basis of 60,000 lbs. per sq. in. plates.

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ALTER EGO: All I'm saying is: Look what some of the other boys have found. Both are accepted designs for about the *same* job. Look at the smaller welded section.

But arc welding isn't important enough yet to tread on our toes in this class of work.

ALTER EGO: Neither did highway transportation tread on the toes of rail transportation until all of a sudden—OUCH!! The railroads found their valuable payloads going by truck.

That's right, men are prone to ignore other men's experience until it's too late to use it. We haven't gone into the welding of structural members for some time.

ALTER EGO: Fact is, we never did GO in. We just looked in, because we haven't yet been confronted with the OUCH situation. But just read how the Army, the Navy, the shipbuilders, the Defense production divisions are right now hitting the trail—hard—to arc welding. Let's not wait until OUCH means "Out y'go!"

• •

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shop, and 120 x 120 ft., for machine shop, with small space for office. Installation will include eight large steam hammers and six smaller hammers. Structures will be used for production of steel forgings for aircraft for government, which will provide fund of about $2,700,000 for land, buildings and machinery. McGeorge & Hargett Co., 9400 Quincy Avenue, is architect and engineer.

Elyria Foundry Division, Industrial Brownhoist Corp., Elyria, Ohio, has let general contract to Paugh & Brown, Inc., 6007 Euclid Avenue, Cleveland, for one-story addition, 65 x 200 ft., primarily for a casting cleaning unit. Cost over $80,000 with equipment. Two overhead cranes and other mechanical-handling equipment will be installed. O. D. Conover, 1740 East Twelfth Street, Cleveland, is consulting engineer. Main offices of parent company are at Cleveland.

Aeronautical Corp. of America, Inc., Middletown, Ohio, has asked bids on general contract for one-story addition, about 20,000 sq. ft. of floor space. Cost over $100,000 with equipment. Garriott & Becker, 800 Broadway, are architects; O. W. Motz, 920 East McMillan Street, is consulting engineer, both Cincinnati.

Cleveland Cap Screw Co., 2917 East Seventy-ninth Street, Cleveland, has let general contract to R. E. Nixon Co., 1737 Euclid Avenue, for one-story addition, 130 x 200 ft., with larger part of structure for expansion in production department, and remainder for storage and distribution. Cost close to $90,000 with equipment. H. M. Morse Co., 1500 East Superior Avenue, is architect and engineer.

J. I. Case Co., 1649 Olentangy River Road, Columbus, Ohio, agricultural machinery, parts, etc., is erecting one-story addition, 92 x 140 ft., to branch, storage and distributing plant, for which general contract recently was let to Leo E. Ruisinger, 851 Frebis Avenue. Cost about $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 21 for one gasoline engine locomotive crane for yard at Burns City, Ind.; also similar crane for Fallbrook, Cal. (Schedule 8869).

Perfect Circle Co., Hagerstown, Ind., piston rings, is erecting one-story addition for production of special rings for aircraft engines, tool room and inspection department. Cost over $50,000 with equipment. Company is considering installation of additional equipment at branch works at Newcastle, Ind.

Monsanto Chemical Co., 1700 South Second Street, St. Louis, has let general contract to Boaz-Kiel Construction Co., 4030 Chouteau Avenue, for one-story plant unit, 134 x 180 ft., at Monsanto, near East St. Louis, Ill., for production of special chemicals for government. Cost close to $400,000 with equipment. W. J. Knight & Co., Wainwright Building, St. Louis, are consulting engineers.

Pet Milk Co., Arcade Building, St. Louis, evaporated and powdered milk, etc., plans new one-story processing plant at Siloam Springs, Ark., with storage and distributing buildings, machine shop, power house and auxiliary structures. Cost close to $400,000 with equipment.

Pontiac Motor Division, General Motors Corp., Pontiac, Mich., has let general contract to O. W. Burke Co., Fisher Building, Detroit, for one-story addition, 480 x 640 ft., for service and parts unit. Cost over $600,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., New Center Building, Detroit, is architect and engineer.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, will build new plant at Kansas City, Kan., in Fairfax industrial district, instead of Kansas City, Mo., recently noted. Main unit will be 150 x 1500 ft., with auxiliary buildings. General contract has been let to Collins Construction Co., Davidson Building, Kansas City, Mo. Plant will manufacture semi-trailers and allied equipment for government, and will be operated in conjunction with branch works at Kansas City, Kan. Cost over $1,500,000 with machinery. Charles E. Keyser, Merriam Building, last noted city, is architect.

Superior Tool & Die Co., 21535 Hoover Avenue, Detroit, has let general contract to Austin Co., Cleveland, for one-story plant at Ferndale, Mich., to be occupied by Standard Reamer & Tool Co., 2620 Elmwood Avenue, Detroit, a subsidiary which will carry out expansion at new location. Cost close to $50,000 with equipment.

Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, plans one-story addition, about 60,000 sq. ft. of floor space, to branch plant at Aurora, Ill. Cost over $125,000 with equipment.

American Steel Foundries, Inc., 410 North Michigan Boulevard, Chicago, will build new plant at East Chicago, Ind., for production of motor tank equipment for government. Cost about $9,413,000. Fund in that amount will be secured from Defense Plant Corp., Washington.

American Steel & Wire Co., 208 South LaSalle Street, Chicago, has let general contract to Powers-Thompson Construction Co., 27 South Chicago Avenue, Joliet, Ill., for excavation and substructures for two additions to mill at Joliet, one-story, 960 x 1500 ft., for new wire mill, and 150 x 475 ft., and 80 ft. high, for rod mill. Cost over $2,000,000 with equipment.

American Brass Co., Waterbury, Conn., has filed plans for three one-story additions to branch plant on Eighteenth Avenue, Kenosha, Wis., for which general contract recently was let to Austin Co., Cleveland. Structures will be 120 x 256 ft., 85 x 256 ft., and 86 x 260 ft., and will be used for production for government. Cost over $800,000 with equipment. Financing will be provided by Defense Plant Corp., Washington.

Continental Machines, Inc., 1301 Washington Avenue South, Minneapolis, Minn., combination sawing and filing machines, has asked bids on general contract for one-story plant, 80 x 200 ft., at Savage, Minn. Cost over $85,000 with equipment.

Coca-Cola Co., 7 East Seventy-third Street, Chicago, has let general contract to Paschen Contractors, Inc., 221 North LaSalle Street, for two-story mechanical-bottling, storage and distributing plant, 180 x 209 ft., at 746 South Jefferson Street, including service and garage unit for company motor trucks. Cost about $340,000 with equipment. Shaw, Naess & Murphy, 80 East Jackson Boulevard, are architects.

A. O. Smith Corp., Milwaukee, has let general contract to Hunzinger Construction Co., Butler, for one-story addition, about 260 x 562 ft. This is part of expansion to be carried out for production of aircraft parts for government, for which fund of $2,760,000 is being secured through Defense Plant Corp., Washington.

Western States

● **Northrup Aircraft, Inc.,** 1001 East Broadway, Hawthorne, Cal., has let general contract to E. S. McKittrick Co., 7839 Santa Fe Avenue, Huntington Park, Cal., for two one-story additions, 60 x 160 ft., and 60 x 100 ft., for storage and distribution. Cost over $70,000 with equipment.

Pacific Brass Foundry Co., 251 Second Street, San Francisco, brass, bronze and other metal castings, plans one-story addition for expansion. Cost close to $45,000 with equipment. Norman B. Green, 55 New Montgomery Street, is engineer.

Bureau of Reclamation, Denver, asks bids until Oct. 20 for 40 steel radial gates and 40 radial-gate hoists for structures on A and B canals and laterals, Yuma-Mesa division, Gila project, Ariz. (Specification 1567-D); until Oct. 22 for motor-control equipment for pumping plant No. 1, gravity main canal, same project, and substation control equipment for Gila power substation, Parker dam power project, Arizona-California (Specification 1570-D).

Basic Magnesium, Inc., Hanna Building, Cleveland, recently organized subsidiary of Basic Refractories, Inc., same address, has opened offices in War Memorial Building, Las Vegas, Nev., for engineering and supervision of erection for new plant for magnesium production for government at Midway, near Las Vegas. Contract for plant has been let to McNeil Construction Co., 5860 Avalon Boulevard, Los Angeles. Company also will develop magnesite mining properties near Lake Meade, Nev., and will build ore-treating plant near Luning, Nev. At Midway works, several by-products plants will be erected for production of chlorine, salt and other specialties. Entire project will cost $63,000,000, of which about $20,000,000 will be expended for buildings and remainder for machinery and other equipment. Appropriation in gross amount is being furnished by Defense Plant Corp., Washington. Lewis E. Ashbaugh is supervising engineer at Las Vegas.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Oct. 21 for six portable, electric conveyors for Oakland, Cal., yard (Schedule 8880).

Canada

● **Canadian Foundries & Forgings, Ltd.,** Welland, Ont., is erecting one-story addition, 60 x 165 ft., for expansion in machine shops, for which general contract recently was let to Gardner Construction Co., Ltd., 7 Riverbank Street. Cost over $70,000 with equipment.

Department of Munitions and Supply, Ottawa, has plans for new one-story plant, 455 x 560 ft., at St. Malo, Que., with smaller adjoining units, for cartridge production. Cost close to $1,000,000 with machinery.

Cansfield Electrical Works, Ltd., 260 Geary Street, Toronto, will take bids soon on general contract for one-story addition. Cost close to $50,000 with equipment.

International Harvester Co. of Canada, Ltd., Sherman Avenue, Hamilton, Ont., plans one-story factory branch, storage and distributing plant. Cost close to $180,000 with equipment.

Anaconda American Brass, Ltd., New Toronto, Ont., plans addition and alterations to plant, to cost about $60,000 with equipment.

Rogers Majestic Corp., Ltd., Fleet Street at Bathurst Street, Toronto, radio equipment, etc., will call tenders soon for an addition to cost $70,000. T. Pringle & Son, Room 501, 36 Toronto Street, Toronto, are engineers.

Construction Equipment Co., 180 Valee Street, Montreal, plans erection of machine shop and boiler shop at Dorval, Que., to cost $50,000.

Engine Works & Trading, Inc., 300 St. Sacrement Street, Montreal, has plans by Edward J. Turcotte, 1010 St. Catharines Street West, for an addition, to cost about $60,000 with equipment.

Manganese Steel Castings, Ltd., P. O. Box 478, Sherbrooke, Que., plans foundry addition, to cost about $75,000 with equipment. H. R. Neville is manager.

Ottawa Car & Aircraft, Ltd., 301 Slater Street, Ottawa, Ont., will build an addition to cost $144,000, equipment extra. Doran Construction Co., 78 Bank Street, is general contractor.

Trade Notes . . .

Corrosion Control Corp. announces that its executive offices, laboratory, and entire manufacturing equipment are now located at 34 Smith Street, Norwalk, Conn., where improved production facilities and laboratories will facilitate service.

●

Stanat Tool & Machine Co. has moved to 41-32 27th Street, Long Island City, N. Y., from its old location at 348 Tompkins Avenue, Brooklyn, N. Y.

●

P. W. Bowers & Co., Inc., dealer in ferrous and non-ferrous metals, will move its offices to 67 Park Avenue, New York, on Oct. 1. Since 1937 the firm has been located at 16 Park Avenue.

●

Gould Storage Battery Corp. of Depew, N. Y., has opened a new office at 430 Frick Bldg., Pittsburgh, in charge of S. E. Gane, sales representative since 1920. He will be assisted by E. J. Boyle.